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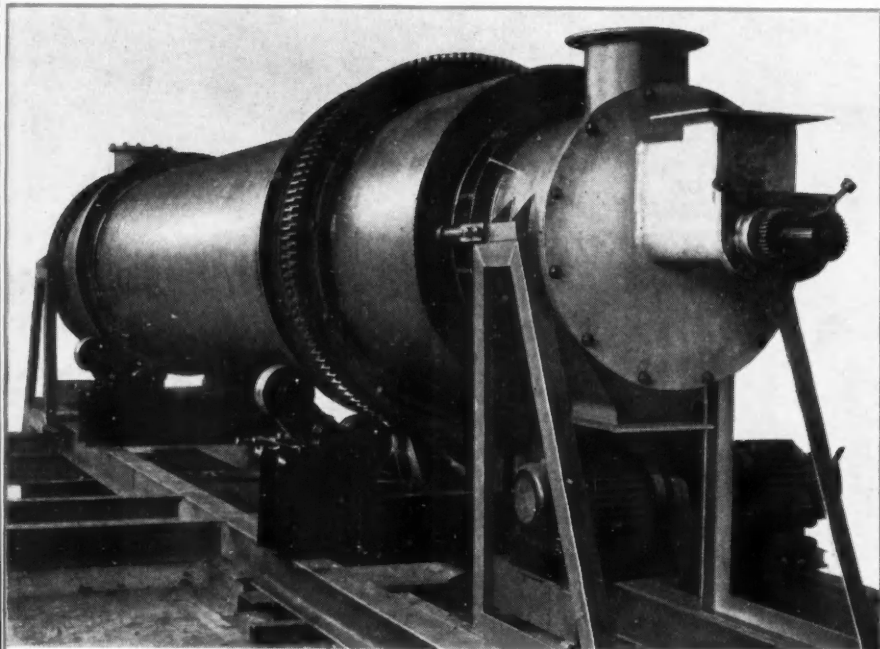
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VOL LXI

19 NOVEMBER 1949

No 1584



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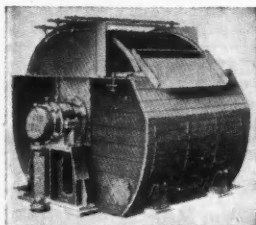
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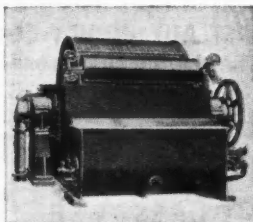
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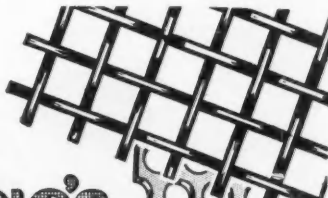


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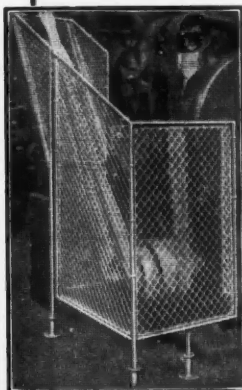
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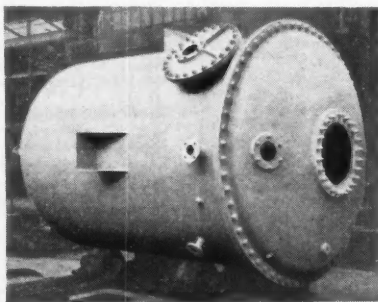
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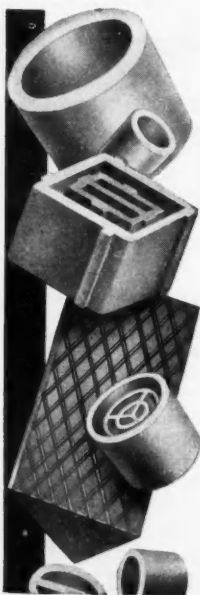
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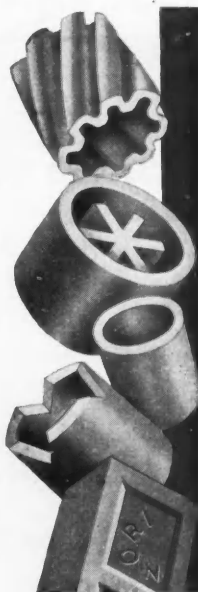
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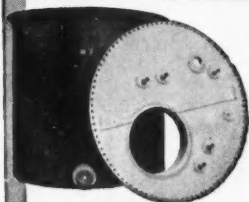
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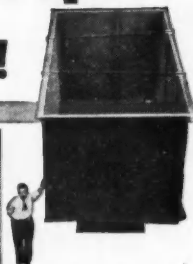
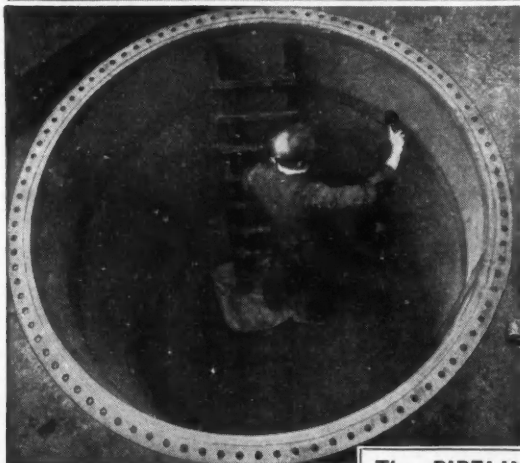




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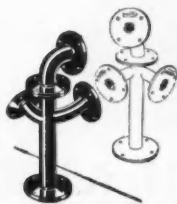
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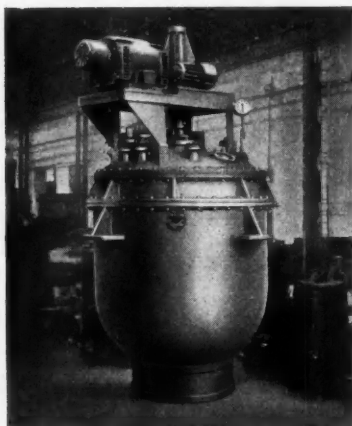
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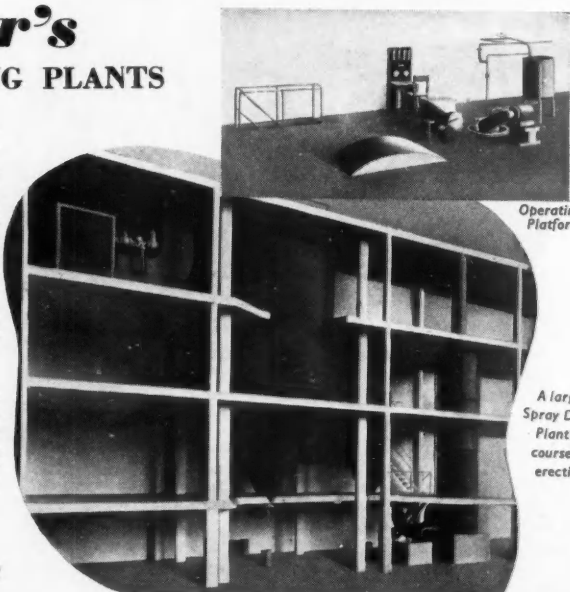
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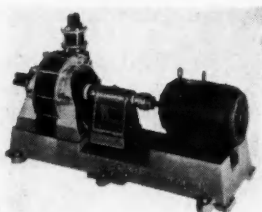
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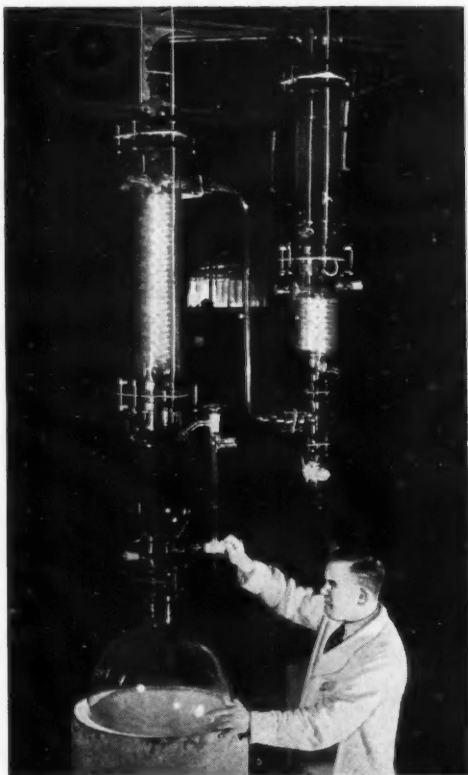
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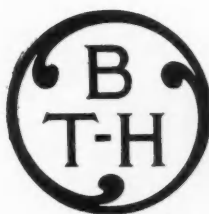
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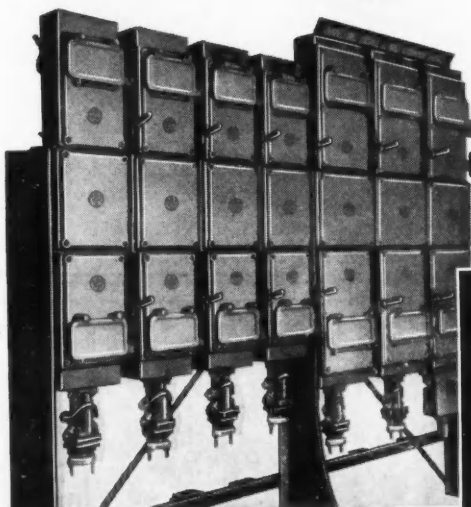
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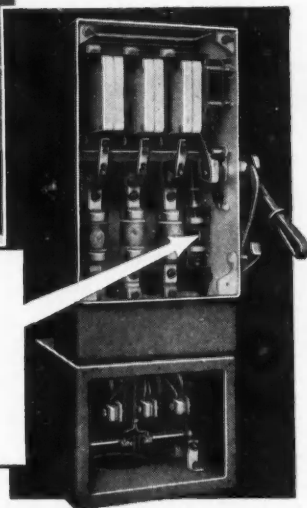
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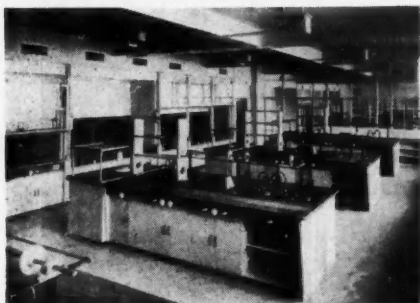
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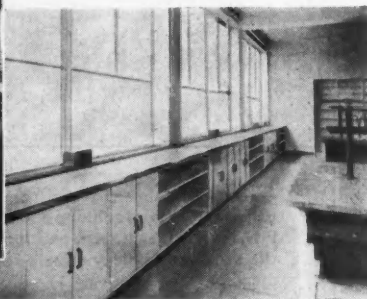


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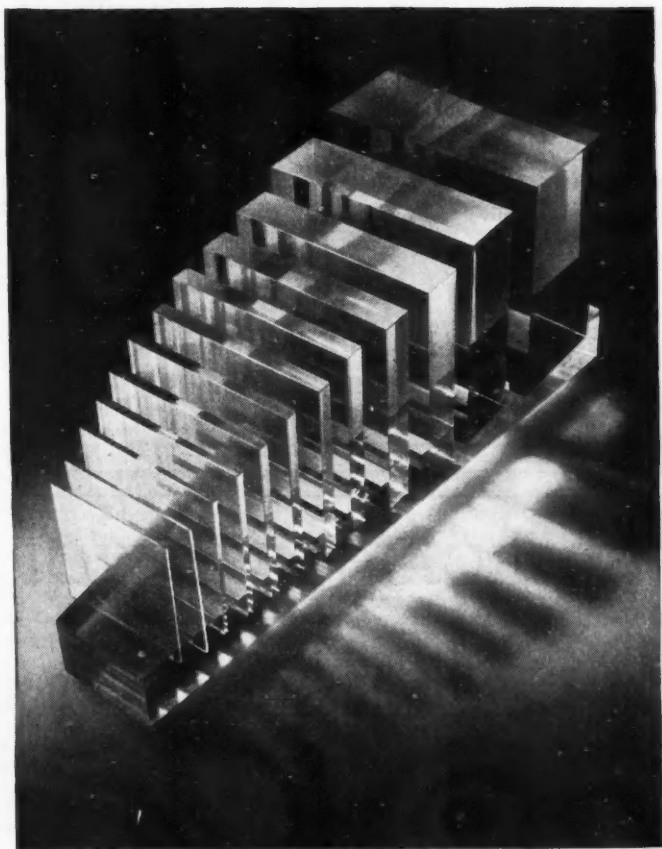


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Volume LXI

19 November 1949

Number 1584

Widening Student Exchanges

FEW things are more heartening in a period in world affairs in which steps to closer accord are hesitant and encompassed with difficulties—which some countries are intent on magnifying—than the little publicised exchange of industrial and university students of most of the European countries. This reassuring undertaking—reassuring because it knows nothing of deadlocks or wounded national pride and forms a bridge which becomes firmer and broader with use—is the far-sighted mission of IAESTE (the International Association for the Exchange of Students for Technical Experience is its deceptively formidable title), which has completed and surveyed a second year's experience of sending forth or receiving the student technicians of 10 Continental countries.

Some satisfaction is encouraged by the knowledge that Great Britain, represented by the Imperial College, was, with France, one of the initiators of this liberal scheme and continues to be one of the most active in promoting its extension. To-day the scheme has the warm backing of—in addition to Britain and France—Austria, Belgium, Denmark, Finland, the Netherlands, Norway, Sweden and Switzerland, which collectively arranged the recep-

tion during last summer in each other's industrial plants and training centres of 1236 young people anxious to study industrial techniques not readily available to them in their own countries. The summer before, the first in which the scheme operated, 920 students gained their first insight of another people's industry and technology. There is every indication that the heightened success of the second year's enterprise and the plans now being formulated in the light of closer experience will ensure in 1950 an even larger increase in this mutually attractive form of international exchange.

Great Britain can safely be expected to play a more active part than any other country in this multilateral exchange, as she has done in the past. Last year this country extended hospitality to 314 students, substantially more than any other country, except possibly Sweden (288), and in 1948 received 191. That hospitality was very generously requited, for in both years British students outnumbered those of any other country in this search for new horizons. Last summer 285 were cordially received in foreign factories and homes and by all accounts gained and gave lasting impressions the value of which cannot be

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The annual subscription to THE CHEMICAL AGE is 30s.; single copies, 9d.; post paid, 1s. SCOTTISH OFFICE: 116 Hope Street, Glasgow (Central 3970). MIDLANDS OFFICE: Daimler House, Paradise Street, Birmingham Midland 0784-5). THE CHEMICAL AGE offices are closed on Saturdays in accordance with the adoption of the five-day week by Benn Brothers, Limited

measured entirely in terms of industrial proficiency.

This is so manifestly one of the most fruitful ways of implementing the ideals of UNESCO in more directions than one that it may come as a surprise to many to observe that IAESTE is not one more of the many offshoots of the international organisation. UNESCO's benevolence towards the student organisation is, of course, assured and its interest has been reflected in the attention it gave to a special report on IAESTE, presented in June and subsequently publicised by the international secretariat, and to a further report given by the general secretary to the meeting of experts in Paris last September. As a sequel, the executive of UNESCO decided that month to recognise the student organisation as the competent body for future consultation. The co-existence of two such bodies sharing interests so nearly identical must appear as an anomaly against the present trend to seek increasing cohesion in administration of European affairs. The explanation is no doubt to be found in the brief comment by IAESTE, that its decision, last January, to remain a separate entity, without affiliation to any larger international organisation, was correct.

That policy is said to have considerably simplified general organisation and secured the indispensable condition that each nation's committee should have perfect freedom of action. What has been achieved by essentially voluntary and more or less spontaneous enterprise is the best evidence that the present policy is the right one.

The fields in which IAESTE has been able to organise industrial exchanges, wide as they are, are restricted by the short time the scheme has been in existence and the fact that the whole depends upon generous collaboration of individual industries in the countries concerned. That involves accepting as temporary employees untrained or semi-trained people having everything to learn and little to give—except their precious contribution to international good fellowship. Analysis of distribution of students among industries reveals the expected result that mechanical and electrical engineering was the objective of most (408 and 216 students, respectively). Third place in order of popularity of the 15 industries listed was taken by chemical engineering, which significantly attracted five more than did civil engineering—187. Great Britain's contribution to that training was

(continued on page 694)

Notes and Comments

Wages and Profits

TIMELY and forceful was the reminder given last week—by a spokesman usually not prone to give political advice—that partisan treatment of labour at the expense of industries cannot be indulged in without inviting economic disaster. Lord McGowan, Imperial Chemical Industries chairman, presented a Bristol audience with a catalogue of some of the crippling impediments which still often render the ideal of virile competition in overseas markets incapable of being realised. He touched also on the much publicised topics of industrial profits and personal incomes, calling attention to the increasing tendency to confuse the two and burden both without much distinction between their very different functions. Distributed profits, as he pointed out, are the only ones entering into personal incomes, and he showed that the reputed vast increase in distribution is mostly imaginary.

A Contrast

"IN 1938," said the I.C.I. chairman, "wages amounted to £1735 million, while in 1948 they had reached the total of £3975 million, or an increase of £129 per cent. Compared with these figures the distributed profits of companies amounted to £506 million in 1938 and to £730 million in 1948, an increase of 44 per cent. Taking the original totals as a starting point, the *Economist* has calculated that if an adjustment is made for direct taxation, wages show an increase of 116 per cent on 1938, while distributed profits of companies show an increase of only 37 per cent. Do these figures reveal a picture of shareholders growing rich at the expense of wage earners? In the light of these figures, I suggest that the latest increase in the distributed profits tax is a vindictive piece of legislation, without justification of any kind."

Grains of Paradise

IN a period characterised by uncertainty about a great many things there is satisfaction to be had from contemplation of the continuity of some undertakings, such as the voluntary work of experts to produce the British Pharmaceutical Codex, the fifth monumental edition of which has just been launched. Because of war, 15 years have passed since its predecessor was completed. Completed is perhaps too strong a word, for in normal times the issue of one edition merely marks the beginning of the next. Since its first appearance more than 40 years ago, the Codex has supplied standards for drugs and preparations not included in the "British Pharmacopoeia," covering galenic standards, ligatures and sutures, pharmaceutical chemistry, pharmacognosy, and pharmacy and surgical dressings. Seven sub-committees helped in the production, which shows considerable revision in contents and methods of presentation. Since 1934, the Codex has been kept up to date, as far as possible, by seven supplements issued between 1940 and 1945. Mr. F. C. Denston (now deputy secretary to the British Pharmacopoeia Commission) who was appointed editor on the death of Mr. C. E. Corfield in 1945, last week gave to the Pharmaceutical Society a good account of the new volume. The work is divided into seven parts, containing many new monographs and some 250 new preparations. Almost inevitably, there have been minor criticisms of detail, but there was unanimous agreement on the fine work accomplished by Mr. Denston in co-ordinating and sifting so formidable a mass of material and keeping a proper balance and proportion. There is a whiff of nostalgia, as well as evidence of continuity, about this new Codex. The former is on account of numerous excisions from Appendix 12 of noble "antiques." Pharmacists of the old school may well

shed a decorous tear at the disappearance of such romantically descriptive entries as "Prayer Bead," "Mad Weed" and "Grains of Paradise." There is no romance about cerevisiae fermentum siccatum and succinylsulphathiazolum.

People and Paint

AN interesting departure from the meticulously documental findings of the paint chemist on the why and how of paint behaviour is the consumers' view—what they like in paints and why they like it. The domestic paint user is a stern critic; that is evident in the 81-page survey, "People and Paint," just issued by the Paints Division of I.C.I., Ltd. It represents a distillation of the opinions of over 2000 housewives from many parts of the United Kingdom on the wearing

qualities or attractiveness, or the reverse, of the paint finish on selected items of domestic equipment and furniture. These domestic consumers were also asked to give their views on the interior decoration of their homes and the results leave no doubt that the users have very pronounced views, as important, perhaps, as any other data on which the oil and colour chemists have to work. A summary of the main findings shows that the most frequently mentioned fault concerns flaking and peeling of wash or distemper on walls and ceilings. Deterioration of the finish of household equipment is frequently attributed to hard wear. Traditional colours are mainly desired. Complaints by users concerning finish related chiefly to bicycles (62 per cent), lawn mowers and perambulators (51 per cent). Furniture finishes satisfy four out of five housewives.

WIDENING STUDENT EXCHANGES

(continued from page 692)

extended to 32. Fifty-eight sought chemical engineering experience in Sweden and 41 in the Netherlands. Of the 44 chemistry students from all countries, 27 came to this country, more than twice as many as any other participant received.

In Great Britain more than 130 industrial organisations, among which chemicals, metals and scientific instruments were fully represented, volunteered to be employers and instructors, and the thoroughness with which they performed their rôle has received a warm testimony in many student reports. That benevolence is fortunately not peculiar to this country; the cordiality of their reception in the workshops and by the people overseas has been recorded in warm terms by British students. Their frequent lack of a working knowledge of the language of their hosts was characteristically considered no impediment. The preference for speaking English appears to be as widespread as ever it was. That exchanges such as this, in any language, are still eagerly sought should be a subject for profound thankfulness.

Simplifying Recording

ADVANCED modern equipment for the efficient running of business or facilitating the administration of works or laboratories has had its widest showing at the Business Efficiency Exhibition at Olympia, London, which closes today (Saturday).

Official visits were paid this week by representatives of the office appliance trades in Belgium, France, the Netherlands and Switzerland. Attendance generally has been higher and average exports throughout the industry are stated to have been three times larger than in the first year after the war.

Among the exhibits lending themselves to use in documentation was the Hollerith punch-card equipment demonstrated by the British Tabulating Machine Co., Ltd. These machines, besides being used for statistical purposes such as pay, costs, etc., are being increasingly employed for coding in libraries, for the documentation of scientific papers, and at Cambridge University in connection with the records of crystallography findings.

Another instrument for recording technical extracts, documents, or photographs, the Admel reprostat unit makes positive and negative photo prints on a range of emulsion-coated photographic materials by reflex copying. This requires neither lens nor camera.

LORD MCGOWAN ON INCENTIVES

Success of Piece Rates in I.C.I.

“WHAT we need is not a wage structure guaranteeing a certain standard of living, but a wage policy of incentives and sanctions which will encourage the industrious and penalise the lazy. It is for that reason that I should like to see the increasing use, in every industry where it is possible, of work measurement and piece rates as a method of wage payment, a development which incidentally has already successfully gone some distance in my own company.”

Lord McGowan, chairman of Imperial Chemical Industries, Ltd., said this at Birmingham Town Hall, on November 10, at the opening meeting of the winter series of Free Enterprise talks organised by the National Union of Manufacturers to which he contributed an outspoken review of recent industrial and national affairs.

Another vexed question is that of hours of work (said Lord McGowan). I think I am stating a fact when I say it is now widely agreed that the effort to shorten the standard working week, compared with the pre-war level, was a mistake; do not forget that with the reduction in the hours of the working week, wages were not reduced.

The true solution to my mind is not to increase production by working longer hours, but to obtain greater production from existing hours of work by greater effort. That there is room for this I have no doubt.

Waning Enthusiasm

One of the consequences of over-full employment and the breaking down of incentives to hard work, partly as a result of our vast burden of taxation, is an obvious lessening of effort. It shows itself in slower rates of working, in absenteeism, in unofficial strikes, in obstruction to new and more economic methods of working, in the creation of unnecessary jobs among operatives working as a team, in unpunctuality, in innumerable rest pauses or breaks for one reason or another, and in many similar ways.

In our straitened circumstances industry can no longer afford to employ the workshy, the habitual absentee and the incompetent. They must be weeded out and it is contrary to the national interest that they should continue to be protected by the trade unions representing them.

I have confidence in our trade unions.

I believe that they will succeed in re-establishing the control over their members which they seem to have lost. But we should deceive ourselves if we thought that they will have an easy task. It is a supremely difficult and delicate one, calling for strength of character, skill and tact. It behoves us, as industrialists, to show an understanding of their problems and to help them and our workers in any way we can.

Vital Co-operation

On the subject of the relationship between management and labour, Lord McGowan said it was essential, in his opinion, that management should get closer to the workers and explain to them far more of what is involved in regard to the problems that beset their particular industry, and the country. That was an example of human relations, which were all-important, and on which confidence for the future largely depended.

Turning to some other points upon which, he said, there had in recent times been shed more heat than light, Lord McGowan dealt with the Government's twin policies on prices affected by devaluation. In his speech in the devaluation debate, the Chancellor of the Exchequer suggested that there were no grounds for manufacturers raising their prices because their raw materials now cost more, until such time as their stocks of raw materials, purchased before devaluation, had been used up. Almost immediately after, however, the Ministry of Supply increased the prices of the metals with which it deals.

On the issue of nationalisation, Lord McGowan said he remained unrepentant. Whatever might be said in favour of nationalising services in the nature of public utilities, it was, in his view, fatal for the State to take over manufacturing industries, especially where they had overseas connections.

What is to be gained by nationalising efficient private industries such as cement and sugar, two at present under threat? Nothing could be gained by this policy, and it could produce disaster to our economic life.

One plea of the Prime Minister (continued Lord McGowan) was that the level of efficiency in the less efficient firms should be raised closer to that of the best.

I do not hesitate to suggest that the success and efficiency of the better firms are in no small measure due to their expenditure on research, and I would make a plea for greater research in industry. Moreover, I would throw out the suggestion in passing that those firms which draw some part of their personnel from the universities might well give some financial assistance to them by the creation of university fellowships or in some other way.

Empire—the Solution

Lifting our eyes for a moment from the domestic scene, in which direction shall we seek the way to a lasting solution of our problem, especially since we see no evidence on the part of America to reduce their tariffs? With tariffs as they are, how can we be expected to compete with the mass production which prevails to such a large extent in the United States? . . .

Surely what we must aim for is a renewed drive to make the most of the Empire's resources and her people's skill. Our system of tariff preferences within the Empire has been directed precisely to this end—the more intensive development of available natural and human possibilities. Outside hostility to these preferences is, I think, profoundly misguided; they have played a vital part in promoting stability and steady progress within the Empire, from which the rest of the world has reaped considerable benefits.

We have to admit, however, that our special ties with the Empire are not in themselves enough. We have now in addition to concert measures in common with our immediate neighbours in Western Europe. The pre-war problems of these ancient states, including Great Britain,

have been brought to a pitch of crisis as a result of the second world war. But while it has become evident that common action and unity of purpose within Western Europe is an absolute necessity, we have to recognise that the road is a stony one indeed.

National economies, which have evolved under varying conditions over hundreds of years, cannot overnight be welded into one. But let me say here that the major difficulty is not in fact the inherent clash between Great Britain's existing Commonwealth commitments, and her newly assumed rôle as a full partner in Western Europe. Britain is not the only European country which has such connections. Moreover, on a moment's reflection, it is abundantly clear that a united Western Europe will be all the stronger for including these countries, France, Holland, and others, as well as ourselves, who bring something more than their metropolitan resources into the union.

Ability to Survive

If what I have said suggests a spirit of pessimism I would wish to remove that impression. I am an optimist as regards our ability to survive the present crisis if we face up to our problems, serious and diverse as they are. We have immense reserves of character which have seen us through in the past, but simply to rely on this historic fact, and our past traditions, will not suffice.

If we are to survive there must be a new spirit inculcated in the minds of our people to ensure that every ounce of effort, both brawn and brain, of which we are each capable, is expended in the solution of our economic and financial difficulties.

Anglo-Belgian Collaboration on Plastics

A LONG-TERM agreement has been made by Solvay & Company, of Brussels, and Imperial Chemical Industries, Ltd., to promote the manufacture and development of polyvinyl chloride in Belgium and certain other European countries.

A new company, Solvic S.A., has been formed by the Belgian company and I.C.I. to manufacture vinyl chloride, PVC and its primary derivatives, including latex, pastes, and extrusion and moulding compounds, announced I.C.I. in London last week. Vinyl chloride monomer and polymer plants, using I.C.I. processes, have been built on a part of the Solvay Works site at Jemeppe-sur-Sambre,

Polymer will probably be on sale towards the end of this year and extension of production is planned.

All I.C.I.'s patents and knowledge in this field will be available, and the English company will in the initial stages give service to customers and encourage the development of new uses.

Solvay & Co. will provide the raw material, chlorine, and has released experienced staff and trained workers to form a nucleus for the new company.

The director of Solvic S.A. is M. Léon Flamache, who has been general research manager of Solvay & Company for many years.

THE ASPATRON

Conflicting Views on Simplified Irradiation

THE possibility of producing artificially radioactive material, such as radioactive isotopes, by means greatly simpler than any now in use was discussed in connection with a demonstration at the A.S.P. Chemical Company, Gerrards Cross, last week, of a new apparatus, the Aspatron.

The inventor, Mr. Robert Barker, physicist of the A.S.P. company, told THE CHEMICAL AGE and other representatives who had been invited to see the Aspatron he believed it to be capable of producing short-life radioactive isotopes without recourse to any other apparatus.

The outstanding characteristic of the Aspatron, contrasting with all other atomic energy assemblies, is its extreme simplicity. It resembles a large tea-urn and its mechanical make-up is almost as simple: primarily an outer canister of high purity burnished copper, within which is an inner lining, also of highly refined copper. Water, as a moderator, is contained between the two, within a wall space of about 2 in.

Uranium Oxide

Ten circular trays, each pierced in the centre, are placed on top of each other in the water-jacketed vessel, leaving a central funnel of about 2 in. diameter. This space accommodates a boron-steel "arrestor rod" which maintains the "pile" in a state of quiescence; in operation, a capsule containing material to be irradiated is placed in the tube.

The trays are filled and arranged to hold alternately paraffin wax, serving as a moderator, and uranium oxide. It had not yet been decided, Mr. Barker said, whether the arrangement of one deep tray and one shallow tray alternately was the most effective. It might, for example, create a greater concentration of neutron flux density if the trays were arranged in a sequence of two deep trays and one shallow one.

The Aspatron is primarily intended for use as a source of neutrons in localities where orthodox piles or cyclotrons are not available, it was explained in a statement by the company last week. Such use could enable small quantities of short-life radioactive isotopes to be prepared in equipment relatively inexpensive and sufficiently small and light to be readily transportable.



Mr. Robert Barker demonstrates the arrangement within the Aspatron of the alternating series of trays containing, in operation, uranium oxide and paraffin wax, to act as a partial barrier material

It could prove valuable for use in the radio-therapy departments of hospitals situated at a considerable distance from sources of radioactive isotopes whose useful life is so short that air transport is necessary. The provision on the spot of such material for use in biological and other research institutions would also be made possible. Small quantities of radioactive isotopes might be prepared in equipment weighing in the neighbourhood of 1 cwt.

In the orthodox design of pile, in addition to a high neutron density, there is a considerable amount of gamma radiation which contributes nothing to the efficiency of the chain reaction and is therefore useless from the point of view of the utilisation of atomic energy. The work done at Gerrards Cross, states the company, has been directed towards using gamma radiation to good effect.

It is known that certain elements respond more readily to this so-called "photo-disintegration" than do others. The particular element employed in the Aspatron has a relatively high gamma-neutron cross-section and a disintegration threshold-energy apparently slightly lower than the theoretical value. The Aspatron makes effective use of the gamma-neutron exchange process, thus considerably enhancing the efficiency.

Normal sources of neutrons (fissionable nuclei) are also present. Useless capture of neutrons by the copper employed in the assembly itself is guarded against by adopting a critical "thinness" in construction. The Aspatron's full load of uranium oxide is approximately 85 lb. and the estimated price at which the apparatus can be produced is suggested to be £250. The first to be exported is intended for Gambia, said the company's chairman.

Official Comment

The Ministry of Supply, Atomic Energy Research Establishment, Harwell, was represented at the Gerrards Cross demonstration, and an opinion by the director, Sir John Cockcroft, on the possibility of producing radioactive isotopes in useful quantities "by novel methods" was later circulated by the Ministry.

Britain's Sixth Atomic Centre

A FURTHER addition, making a total of six, to the atomic energy establishments in the United Kingdom was anticipated in a statement this week from the Ministry of Supply. The official account, which omits to state to what department of atomic energy research the new establishment will be devoted, says that the site is at Capenhurst (near Little Sutton), Chester, where the Ministry already has a storage depot. It would be necessary to acquire an additional 150 acres, the Ministry foresees, and while this would necessitate the employment of agricultural land, the special geographical requirements of such a centre made that unavoidable.

The new establishment would be comparatively near the existing ones at Risley and Springfield. Work on the site is to begin next year and will employ several thousand.

Estimates suggested this week in the Liverpool area indicate that some 3000 constructional workers will be needed and it is recalled that Cheshire County Council has in hand a "priority scheme" to erect 500 houses on a 70-acre site at Little Sutton.

"At Harwell," states Sir John Cockcroft, "apart from production in accelerating machines such as the cyclotron, isotopes have been produced in the two piles in very considerable numbers and with a useful concentration of activity for both medical and industrial use.

"To achieve this concentration it is necessary to have available a large flux of neutrons. In the smaller pile at Harwell this is 100,000 million per sq. in. per second. In the large pile the flux is a hundred times larger.

"In spite of these enormous fluxes, a greater concentration of neutrons is desirable for many purposes, and fluxes lower by more than a small factor have failed to produce isotopes of any practical use.

"Calculations and measurements have been made over the last 10 years at the Department of Scientific and Industrial Research and elsewhere on structures using small amounts of uranium. It is well known in scientific circles that the numbers of neutrons obtained in such structures have been some million times less than the number obtained in the small pile at Harwell.

"For this reason neither in Britain nor in any other country has such a method been used for isotope production for practice use."

Atomic Power in Five Years?

THE possibility that a small reactor for the production of power for industry may be operating within four or five years was foreshadowed by Dr. C. J. Mackenzie, president of Canada's National Research Council, speaking recently in Winnipeg to the Manitoba Chamber of Mines. That depended upon certain technical difficulties being overcome. "There is no indication that atomic power will become generally competitive with ordinary central power plants for many, many years," he added. Meanwhile, in Canada, the use of atomic energy for peaceful purposes was making progress in the face of "hampering restrictions of secrecy."

Outlining the progress of research at the atomic energy plant at Chalk River, Ontario—the only plant in the Western Hemisphere in which heavy water, instead of graphite, is used to slow the atomic chain reaction, Dr. Mackenzie recalled that the director of reactor projects for the U.S. Atomic Energy Commission had described the Chalk River reactor as the "world's most advanced." The experimental pile offered research facilities unrivalled at the moment anywhere. Petroleum chemistry was a beneficiary.

U.S. CELLOPHANE

A Third Producer Licensed

COINCIDING with the announcement that the suit by the Anti-Trust Division of the U.S. Department of Justice, charging E. I. Du Pont de Nemours & Co. with monopolistic practices in the making and selling of Cellophane, is scheduled for trial next year (*THE CHEMICAL AGE*, 61, 471), it is reported that the Du Pont Company, in an attempt to expand U.S. production of Cellophane, has licensed Olin Industries, Inc., East Alton, Illinois, to manufacture the product. This is the outcome of more than a year's effort by Du Pont to find a firm willing and able to invest the large amount of capital, estimated at a minimum of \$20 million, necessary to enter the field on an economically efficient basis.

Under the terms of the contract Du Pont agrees to licence Olin Industries under all its Cellophane patents; furnish full technical information and methods of production; assist in the selection of a plant site; design and build an eight-machine plant with an estimated capacity of approximately 33 million lb. of Cellophane a year; help train personnel; and assist in putting the plant into commercial operation. Olin Industries will pay a fixed fee for design and construction of the plant and will also pay Du Pont for licences and technical information.

The entrance of Olin Industries into the cellophane manufacturing business is stated to be a logical expansion of the company's operation into a field in which it already has had wide experience and has conducted intensive research. There will now be three U.S. producers of the film, the third being the American Viscose Company, which recently announced a considerable expansion of its capacity.

Plastic Piping for Farm Irrigation

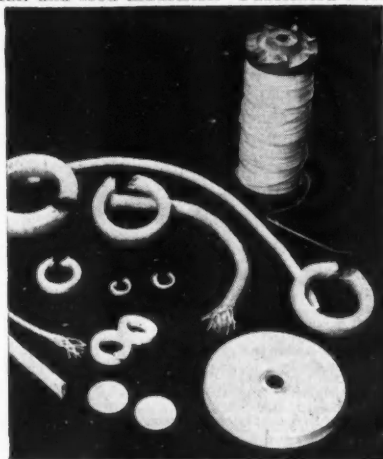
PLANS are under discussion between the Scottish Council (Development and Industry) and Mr. Roy Newton, an Australian engineer and chairman of Die Casters, Ltd., of Melbourne, for the production in Scotland of equipment for the latter's system of land irrigation. The council has taken a six months' option on the scheme, which involves the irrigation of land by plastic conduits 1 ft. underground.

Work is already being done in Australia on the project, for which machinery and equipment worth £50,000 has been shipped

THERMOPLASTIC PACKING

Resistant Forms for Chemical Plant

PROMISING export orders are stated to be coming in for a new type of plastic gland packing, for the oil refining, chemical, and food industries. Fabricated from



[Courtesy of Crane Packing, Ltd., Slough.]

a new thermo-plastic material of marked physical strength, the packings are almost entirely inert to solvent and corrosive attack by oils, chemicals and gases in regular use in industry. The only corrosive substance found to have an effect, a minor effect, was hydrofluoric acid.

The packings are suitable for use in temperatures up to 450° F. The are resistant to deformation, which is valuable in preventing extruding into the clearances used in general engineering; and their texture confers lubricating properties.

from Britain. The Scottish Council has been active in recent years in developing the agricultural equipment and machinery industries in Scotland and has taken particular interest in irrigation systems.

Coinciding with this news is the report that the first installation of Alkathene plastic anti-corrosion piping to be laid in Scotland has just been installed at Cupar, Fife, on Rungally Farm. The piping, made by I.C.I. Ltd., is extremely light. Almost as flexible as rubber, it is claimed to stand severe frost and will not readily corrode.

Basic Chemicals in August and September

Production and Consumption Levels Advance

A SUBSTANTIAL increase in production and use in the U.K. of sulphuric acid and consumption of contributory materials is among the trends shown in official records of movements in key chemicals and some metals in August and September. The enlarged production and supply of acid finds parallels in several other departments of chemical production, when compared with the corresponding period of 1948.

Estimated numbers employed in all sections of the chemical and allied trades in August were once again marked by a

slight increase over the totals for the previous month. Distribution of workers (in thousands) was as follows: coke ovens, chemicals and dyes, explosives, etc., 251.7 (184.2 men, 67.5 women); paints and varnishes 38.1 (26.8 men, 11.3 women); oils, greases, glue, etc., 65.7 (52.3 men, 13.4 women); pharmaceutical, toilet preparations, etc., 82.8 (41.3 men, 41.5 women).

These figures and the table given below are abstracted from the latest issue of the *Monthly Digest of Statistics*, No.46, October (HMSO, 2s. 6d.).

	August, 1949		August, 1948		Stocks
	Production	Consumption	Production	Consumption	
Sulphuric acid	139.1*	129.0	122.4*	119.0	—
Sulphur	—	26.2*	—	21.3*	82.6*
Pyrites	—	17.6*	—	16.5*	59.0*
Spent oxide	—	14.6*	—	16.1*	161.3*
Molasses (cane and beet)	7.8	29.4†	6.8	28.2†	175.2
Industrial alcohol (mil. bulk gal.)	2.13	2.26	1.92	1.88	8.81
Superphosphate	16.0	13.9	15.7	15.9	—
Compound fertilisers	138.4	112.5	135.8	96.4	—
Liming materials	—	429.0	—	319.2	—
Ammonia	—	6.46*	—	6.58*	5.60
Nitrogen content of nitrogenous fertilisers	21.54	19.19	20.48	18.50	—
Phosphate rock	—	82.9	—	77.9	166.1
Virgin aluminium	2.57	13.8	2.37	13.5	—
Virgin copper	—	28.1	—	26.4	115.1
Virgin zinc	—	15.8	—	15.7	61.3
Refined lead	—	17.4	—	14.9	26.0
Tin	—	1.74	—	1.69	17.2
Zinc concentrates	—	11.4	—	13.7	41.0
Magnesium	0.28	0.31	0.35	0.35	—
Pig iron	185.0*	—	181.0*	—	278.0*
Steel ingots and castings (including alloys)	306.0*	—	297.0*	—	986.0
Rubber: Reclaimed	0.41	0.43	0.46	0.47	3.84
Natural (including latex)	—	3.40	—	3.50	57.2
Synthetic	—	0.07	—	0.04	1.91

* September.

† Distilling.

Standardised Commercial Vitamin D₃

THE acute wartime shortage of fish-liver oils to enrich poultry mash made it necessary for alternative products to be made available.

The increasing output of vitamin D₃ concentrates made by the irradiation of recrystallised 7-dehydrocholesterol was one factor which eased the position. Use overseas of vitamin D₃ in oil as a supplement to mashes supplying vitamin A in the form of the vegetable pro-vitamin has, however, influenced the British Standards Institution in preparing specifications to revise the formulation of oil mixtures for animal feed.

Interest in vitamin D₃ solutions was

increasing in Britain and would, it was felt, undoubtedly lead to the marketing of a variety of products made up with various diluent oils, and containing amounts of vitamin D that might well be different for every manufacturer. Some measure of standardisation before that happened seemed to be desirable. It was, therefore, decided to prepare standards for two solutions of different concentration.

The standard provides minimum limits for vitamin potency and maximum acidity, as well as methods of test. It can be obtained from the British Standards Institution, 24 Victoria Street, S.W.1, price 2s., post paid.

POLYMERISATION INHIBITORS

Characteristics of Some Newer Anti-Oxidants

TO prevent the premature polymerisation of monomeric substances and also to arrest or regulate the polymerisation process itself, the chemist has developed a considerable number of inhibitors and so-called polymer regulators. The best known inhibitors are hydroquinone, catechol and pyragallol, the first being most suitable for use with methyl methacrylate.

Other common inhibitors are pyridine, benzoic acid, phenol, resorcinol, benzyl alcohol, ethylamine and benzylamine. There are also some metals, particularly copper and certain inorganic compounds, used to retard polymerisation; the most important is copper acetate.

Where hydroquinone and other well known inhibitors are unsuitable, use is being made of some of the newer anti-oxidants. Of particular interest is 2,5-di-tertiary butyl hydroquinone. This is a white crystalline substance having a melting point of 210-212°C. It is insoluble in water but soluble to the extent of 28 g./100 g. in acetones; 26 g./100 g. in alcohol and 1.5 g./100 g. in benzene. It is a good polymerisation inhibitor for vinyl acetate, styrene and other vinyl-type monomers.

Unlike some other inhibitors this para di-hydric phenol does not interfere with the polymerisation of these monomers at elevated temperatures in the presence of a catalyst. Thus it need not be removed as is required in the use of other stabilisers. In addition to its use as a retardant of polymerisation processes, it is also useful as a stabiliser against ultra-violet deterioration of rubber and synthetic elastomers.

Another hydroquinone derivative of interest as an anti-oxidant, is hydroquinone mono methyl ether. This also is a white crystalline compound and its melting point is 53-54°C., boiling point 243°C. It is slightly soluble in water, 4 g./100 g. solution; readily soluble in acetone, 81 g./100 g.; alcohol 82 g./100 g.; benzene 41 g./100 g. and ethyl acetate 71 g./100 g. solution. This ether is readily soluble in most fats and oils and may be used to prevent rancidity of oleaginous products.

The light yellow crystalline compound, N-N-disecundary butyl *p*-phenylene-diamine, is a powerful anti-oxidant and, because of its solubility in a number of solvents and oils, it is very suitable for use in synthetic elastomers. The compound has a melting point 10°C. (it supercools readily and crystallises with difficulty even at -20°C.); boiling point is 315°C. and specific gravity 25°/20°C. is 0.9360. Another useful anti-oxidant, N-n butyl *p*-aminophenol is also a light yellow compound with a separation temperature of -15°C. It is usually sold as 48 per cent in isopropanol.

Some of the compounds employed as inhibitors are also useful as polymerisation regulators, e.g., hydroquinone, phenol and dodecyl phenol. Probably the best known regulators or arresters are dodecyl mercaptan and di-isopropyl xanthogendisulphide. *p*-benzoquinone is one of the newer regulators; it has a melting point 113-115°C. and, because of the unusual number of conjugated double-bond systems in the molecule, it is a very reactive chemical.

High Resistance of U.S. Fluorine Plastic

A NEW plastic material, Fluorothene, which may facilitate some experiments because it cannot be dissolved by any known solvent, most acids and caustic soda at ordinary temperatures is now being manufactured for the United States Atomic Energy Commission by the Carbide and Carbon Chemicals Corporation at Oak Ridge, Tennessee. The material is based on the compound chlorotrifluoroethylene and is one of the fluorine plastics associated with the atom bomb project. An obvious application of the plastic is in making filters which are chemically resistant to almost all reagents.

While some solvents may swell Fluoro-

thene, extended immersion tests with 125 chemicals at 158°F. failed to dissolve it, and this inertness, coupled with good mechanical strength and comparative ease of fabrication, has enabled research workers to use it in certain operations which previously had been impossible.

Inert filters have been made by flame-spraying finely divided Fluorothene on a suitable base to give a porous, multi-layer coating. Porous filter discs up to 16-in. diameter and 0.5-in. thick have been prepared. They resist acids and most organic solvents and are not wettable by water. They are, as yet, costly and somewhat difficult to fabricate.

PHENOLIC RIVAL OF ACTIVATED CARBON

New Resin's High Adsorption Capacity

From A CORRESPONDENT

ACTIVITY and versatility substantially higher than is encountered in conventional material of its kind is being attributed to a new type of phenolic resin, designed principally as an adsorbent. It was developed in California by the Chemical Process Company.

The new resin, in granular form, possesses a high adsorbent capacity for organic colour bodies and, after exhaustion, its adsorption activity can be repeatedly restored with dilute alkaline solution without diminution of capacity. The resin has no ion-exchange properties in the usual sense and, in general, will not produce any change in pH. It is somewhat more effective in acid than in alkaline solutions but it is physically inert to acids, alkalis and all common solvents.

Adsorption operations with this resin can be carried out in several ways, the most usual being column or bed type percolation, slurry or batch-type application, with subsequent separation by hydraulic, centrifugal or filter-press methods, or in closed "basket" or bag containers immersed in the solution to be heated.

Unlike activated carbon, this adsorbent is clean and easy to handle; the particles are tough, resilient and readily withstand abrasion in upflow operations and slurry or batch-type applications. The resin is stable over a wide range of pH and temperature values.

Types of colour which have been effectively adsorbed include caramel bodies, melanoidin compounds, polyphenols or tannins and food-processing dyestuffs. Liquors successfully decolorised include beet, cane and corn sugar solutions in various stages of refinement, protein hydrolysates, pineapple mill juice, canning syrups, crude aqueous glycerine and a number of solutions of edible dyes.

Tests were carried out to diminish the intense brown colour resulting from the "browning" or melanoidin reaction produced by warming a solution containing monosodium glutamate and dextrose. On passing this solution through a bed of the adsorbent resin, 85-90 per cent of the brown colour was removed. A caramel colour produced by heating sucrose to 200°C. was removed as to 80-90 per cent by percolating the caramel solution through a bed of the granular resin.

At pH values ranging from 0-14 and temperatures up to 90°F. the resin has been found to be effective. Strong oxidising agents, high pH (caustic alkalinity), high dissolved oxygen and high temperatures are liable to have a harmful collective effect on the resin, but, generally speaking, it is said to be capable of giving good results even under difficult conditions of use. Adsorption efficiency has, however, been shown to be largely dependent on viscosity, the best results being obtained with a water-like viscosity.

It is claimed as a result of American experience with this resin that, in terms of Brix, satisfactory adsorption appears to take place at 10 to 15° Brix (at room temperature) and will progressively decrease to less than half as much adsorption activity at about 30° Brix. The decline is nearly linear.

Apart from the obvious use for the removal of colour bodies from aqueous solutions of organic compounds, the resin also promises to be of interest, in some instances, for separating closely related molecules having slightly different degrees of polarity.

Ex-I.G.F. Men Tour Latin America

REPORTS from Buenos Aires state that three representatives of German chemical firms which belonged formerly to the I. G. Farbenindustries, including Mr. Wallot, formerly a director in the Central Financial Administration of the I.G., have recently arrived in Argentina, after having visited Brazil. It is reported that they intend to tour other Latin American countries to investigate the possibilities of establishing new foreign representation of their firms.

The interests of the I. G. in Argentina were taken over by the Government shortly before the defeat of Germany. The German parent companies of the firms concerned do not intend to renew the old representation agreements but it is said that they prefer to appoint private firms.

It is reported that, to avoid the impression that these I.G.F. members are forming a delegation, they arrived in the Argentine capital separately on three consecutive days.

LACQUER SOLVENTS IN THE U.S.A.

Phenomenal Growth of Nitrocellulose Uses

RECENT experience with lacquer solvents in the U.S.A. was discussed by Mr. R. F. Buller, guest speaker from New York, at the last meeting of the London Section of the Oil and Colour Chemists' Association. Mr. L. O. Kekwick (chairman of the section) presided.

Mr. Buller showed that the production of protective and decorative coatings, comprising paints, oleo-resinous varnishes, synthetic enamels and lacquers, now constituted a business with an annual sales value of over one billion dollars. The present dollar sales value of the industry, therefore, was approximately one-fifth of that of the steel industry.

He defined lacquers as any type of surface coating which produced a dry film through the medium of solvent evaporation, as contrasted with paints, varnishes and synthetic enamels which required the polymerisation or oxidation of their solid constituents to yield a dry film, and said that they represented more than 10 per cent of the annual sales value of the entire protective coating industry. The bulk of the lacquers produced employed nitrocellulose as the film-former.

Interest was growing in the use of other types of lacquers for special applications which utilised vinyl resins, ethyl cellulose, acrylic resins or cellulose acetate butyrate as the film-forming base. During the next decade considerable expansion in the production of those lacquers was expected. There was a growing demand.

The growth of the nitrocellulose lacquer industry had been phenomenal. In 1919 the production of nitrocellulose lacquers, including thinners, was about 2½ million gal.; in 1929 the figure was 45 million gal.; in 1937 it was 58 million gal., and it had risen to more than 80 million gal. in 1948.

Synthetic Enamels

That remarkable growth had taken place in spite of the development of alkyd resin based synthetic baking enamels, which had made their appearance about 1930. Although synthetic enamels had replaced nitrocellulose lacquers to a considerable extent in certain uses, the continual growth in the usage of nitrocellulose lacquers was due largely to improvement of their quality and to the development of new applications.

Improvement in the quality of nitro-

cellulose lacquers (and of other types of surface coatings) was due to a fundamental change which had occurred within the entire surface coating industry during the early 1920's. The industry was then in process of changing from an art to a science. Few chemists were employed in the surface coating industry in the early 1920's; by 1948, 41 out of every 1000 industrial chemists were employed on surface coatings. Approximately half those chemists were engaged in research. In only three industries were chemists employed in larger numbers—industrial chemicals, petroleum refining and drugs and pharmaceuticals. The rubber, plastics and food industries each required fewer.

Lustre and Durability

The use of alkyd vehicles in lacquers as plasticisers had improved lustre retention and had increased the solids content; lacquers were now considered to be on a par with synthetic enamels in respect of lustre and durability.

One of the newest developments was the so-called metalli-chrome finish patented by Du Pont in 1946. That finish was a pigmented lacquer characterised by great durability, rich colour and good translucency which provided a glamorous range of motor vehicle finishes in greys, greens and browns.

Nitrocellulose finishes could be formulated to provide coatings with almost any desired property. Their outstanding feature was that, with proper selection of ingredients, rapid or very slow drying lacquers could be prepared. Moreover, nitrocellulose finishes might be coloured with almost any pigment or dye to produce a wide variety of sheens. A wide range of gloss, viscosity, humidity resistance and durability was possible.

It was estimated in the U.S.A. that the automobile market consumed about 20 per cent of nitrocellulose lacquers and thinners, while wood furniture required about 10 per cent.

The coating of paper with nitrocellulose lacquers had many ramifications; and, in addition to their decorative features, the paper lacquers provided crease resistance. Low viscosity nitrocellulose, such as quarter-second or lower, was used in those lacquers to prevent curling of the paper during drying; resins, if used, were the

plasticising type alkyds or dammar. Solvents employed were chiefly the low-boiling ketones or esters. Castor oil, dibutyl phthalate or dioctyl phthalate were the principal plasticisers used. Low cost was an essential requirement.

At present, the nitrocellulose lacquer manufacturer had available for use an unusual variety of raw materials, but for most applications the use of certain specific raw materials predominated. For example, among the important resins used in lacquers were non-drying and drying type alkyds; both were of the glycerol phthalate type. The non-drying alkyds were usually modified with the fatty acids of coconut, castor or cottonseed oil, while the drying type alkyds were generally modified with either linseed, soya or dehydrated castor oil.

The Popular Plasticisers

As plasticisers, castor oil, dibutyl phthalate and dioctyl phthalate were popular. So-called plasticising alkyds were employed extensively where extreme flexibility was required, such as in the preparation of leather finishes, paper lacquers, textile coatings and aluminium foil coatings.

Many types of diluents were used, but principally aliphatic naphthas, aromatic petroleum diluents with an aromatic content ranging from 35 to 80 per cent, and aromatic diluents such as toluene and xylene.

A particularly extensive variety of chemical solvents was available for the nitrocellulose lacquer manufacturers. More than 40 different alcohols and active solvents suitable for nitrocellulose lacquers were produced in quantities sufficient to be available for purchase in tank car lots.

An example of the sort of fundamental solvent data which provided useful information for the lacquer manufacturer, in the formulation of lacquer thinners the excess tolerance of a given series of thinners for toluene would usually indicate which thinner could be prepared most economically.

All might be equally efficient as thinners for a given lacquer and produce films of similar appearance, but they might vary in excess tolerance for toluene by values ranging from 0.7 to 1.3. Obviously, if the thinner with the excess tolerance of 0.7 were quite satisfactory, the thinner with an excess tolerance value of 1.3 probably had an unnecessary excess solvency.

In the formulation of a high solids lacquer, fundamental data on the solids concentrations attainable at a practical

working viscosity with different solvent compositions would reveal the composition providing optimum solvency. For example, after the lacquer manufacturer had decided what ratio of resin to nitrocellulose he wished to use to obtain the desired film properties, the comparative solvency of various active solvent blends was determined.

Most active solvents exhibit their maximum solvent power in the presence of approximately 25 per cent latent solvent. Moreover, the type of diluent or its concentration up to 20-25 per cent did not affect solvency appreciably. For diluent concentrations beyond 20-25 per cent, the solvency of the system would decrease more rapidly with the aliphatic naphtha type diluent than it would with aromatic diluents such as toluene.

For a given active solvent, a suitable economic solvent system providing high solvent power would have approximately the composition—active solvent, 60-55 per cent by volume; latent solvent, 20 per cent, and diluent, 20-25 per cent.

In the course of the discussion which followed the presentation of the paper, Mr. N. F. Sarsfield asked if there was an economic factor which decided from which source the diluents were obtained.

Mr. Buller agreed that there was. The aliphatic naphtha materials he had mentioned had very low aromatic content; the range might be 5-15 per cent. They contained an aromatic material having a long aliphatic side chain connected to an aromatic group; so that the solvency of such material was not so great as that of benzene or xylene.

Production of Esters

Replying to Mr. W. F. Daggett, the speaker said that quite a few companies used ketones and esters; no one company was concerned exclusively with one type of practice. But the total production of esters was considerably greater than that of ketones and it was reasonable to assume that the overall usage of esters would be the greater.

Asked by Mr. M. Ball about the use of hot lacquers, Mr. Buller said they appeared not to be used very largely, but he believed their use was growing. One of the drawbacks to their use had been the problem of keeping the lacquers at constant temperature while spraying, and at the same time avoiding any effect of the lacquers on the gaskets, and so forth, used in the pumps for circulating the lacquers. One manufacturer had recently developed special equipment for that purpose and was having some success with hot lacquers.

INTERNATIONAL MINING ENTERPRISE

Franco-German Niobium Development

A SIGNIFICANT development in Franco-German post-war economic relations has recently taken place in Baden in the French zone of Germany, where the Diet has passed a bill authorising the Land Government to participate to the extent of Dm.70,000 in the Niob-Bergbau G.m.b.H., Kaiserstuhl. The object is stated to be the exploitation of niobium-containing minerals in Baden, which, with the exception of the Norwegian occurrences, are believed to be the only European deposits worth working on a commercial scale.

Niobium—which is playing an increasingly important rôle in radio and radar techniques—is on the Inter-Allied list of items which may not be manufactured in Germany. It appears, therefore, that the formation of the Niob-Bergbau G.m.b.H. is a method of circumventing this ban.

The proposed new company is to be financed to 70 per cent by the Government of Baden and to 30 per cent by a French concern, the Fabriques de Produits Chimiques de Tham et Mulhouse, S.A., and the company's board is to comprise three representatives of Baden and two of the French concern. It is also proposed to set up an arbitration tribunal, to be staffed by Swiss members, to settle any points of dispute between the contracting parties.

The company expects an influx of foreign exchange amounting to as much as Dm.300,000 within its first year of operations, to be utilised for commodity purchases in France.

It is proposed that the Niob-Bergbau G.m.b.H. shall mine the niobium-containing material and burn it to get rid of carbon in the form of carbon dioxide; the burnt material is then to be transported to the Alsace works of the French concern, where the niobium will be extracted.

French Potash Prospects

NEW methods, using American mining equipment and technique, for the fuller exploitation of the potassium mines at Alsace are being employed by the Mines Dominales de Potasse d'Alsace. It is hoped that the net output, at present 6-8 tons per day, will be doubled, while labour costs, which account for about 45 per cent of the cost price, will be decreased.

Plans for greater production have been under consideration since 1946 and it has been found that modern mechanical equipment is essential if the desired increase is to be achieved.

Experts are now studying problems of modification in lighting and ventilation, dimensions of supports and chambers in the galleries 500-700 metres below the surface where the two layers of sylvinitic lie.

Iron Activity in Venezuela

PREPARATORY to undertaking commercial iron-ore mining, the Iron Mines of Venezuela, at El Pao, is continuing to construct installations, including a standard gauge railroad, representing an eventual investment of approximately \$50 million. Output during the first full year of operation is expected to reach 2 million tons. The railroad, from Palua on the Orinoco River, to the mine pit, about 50 kilometres, is expected to be operating in December.

The Oliver Iron Mining Company, an American firm, which holds a large iron-ore concession in the vicinity of Ciudad Bolivar, has started a survey to determine whether it would be more economical to transport ore by railroad to the sea coast than to ship it down the Orinoco River.

At the present time, the whole of the State of Bolivar and the federal territory of Delta Amacuro, comprising the most promising area of iron-ore deposits in Venezuela, have been declared by the Government reserved for exploration and exploitation of iron ore.

Mexican Sulphur Deposits

UNDER a contract made with the National Commission for Stimulation of the Mining Industry, a department of Mexico's Ministry of National Economy, the Cia. Exploradora del Istmo, S.A., will undertake experimental exploitation of vast sulphur deposits on the Isthmus of Tehuantepec, which may eventually free Mexico of dependence on imports for her sulphur needs. The deposits were discovered during drilling operations for oil.

Under the terms of the contract, the company must give the commission a royalty on sulphur obtained. Mexico now imports about 3000 tons of sulphur annually.

PREPARING MICRO-SPECIMENS

U.S. Advance in Precise Microtomy

From A SPECIAL CORRESPONDENT

A NEW method of ultra-microtomy, developed recently by S. B. Newman, Emil Borysko and Max Swerdlow, of the U.S. National Bureau of Standards, now provides an inexpensive, practical means of preparing very thin sections of biological tissue for study with either the light or electron microscope (Fig. 1).

Work is now in progress at the National Bureau of Standards to apply the new method to the study of the structure of natural and artificial fibres found in leather, paper and textiles.

In the new procedure, *n*-butyl methacrylate is polymerised around the specimen to produce an optically clear embedding medium having highly desirable cutting properties. A smooth, continuous advance of the specimen towards the knife of a slightly modified conventional microtome is then obtained from the thermal expansion of a metal specimen holder. Thus, sections of tissue having uniform thickness of fractions of a micron over a large area and undistorted structure may be cut one at a time.

The need in many research fields for an efficient method of producing uniform thin sections of tissue has been apparent for several years. The application of the electron microscope to many biological problems has in fact been hampered by the lack of such a method. Because of

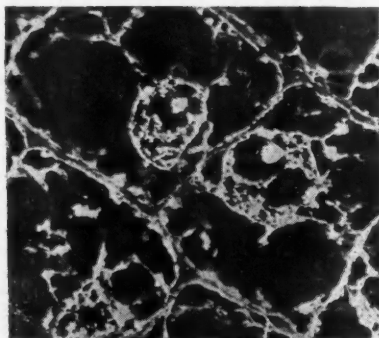


Fig. 1. Reproduction of an electron micrograph of an extremely thin cross-section of onion root tip in the zone of elongation. (Magnification $\times 3750$)

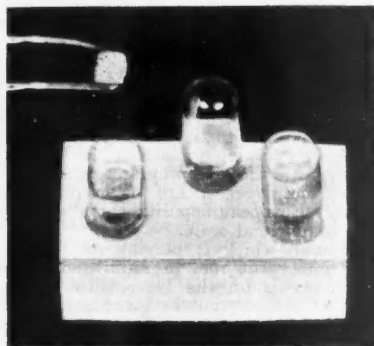


Fig. 2. Specimen tissue being placed in the gelatin capsules in which they are embedded in a monomer to which a polymeriser has been added

the very slight penetrating power of the electron beam in commercial instruments and the great relative depth of field involved, specimen structure is difficult to interpret when sections are over a fraction of a micron in thickness. At the same time, techniques available for preparing thin sections have been elaborate and difficult, producing few usable sections.

The most recent modification before this was that of Pease and Baker, who used a modified Spencer rotary microtome and reduced the unit specimen advance to approximately $1/10$ the calibrated value. The microtome was then reported to produce sections as thin as 0.1 micron from tissue embedded in paraffin and collodion. Many workers, however, have found it difficult to use this technique.

The U.S. National Bureau of Standards sought to develop a rapid, efficient sectioning procedure which could be carried out in routine fashion by an operator without a great deal of special training. The resulting method, which goes far in accomplishing this objective, should be of decided advantage in those fields of biology, medicine, agriculture, and industrial technology that are concerned with the microstructure of plant and animal material.

An important feature of the new method is an easily made, inexpensive device which holds the embedded specimen and advances it gradually and uniformly towards the knife of the microtome. This device may be employed without drastically modifying the conventional microtome. It is essentially a brass block in which a hole is threaded at one end to receive a standard $\frac{3}{8}$ -in. brass pipe plug. A cavity drilled in the face of the plug provides a seat for the embedded specimen.

Behind the plug is a needle valve, which admits compressed carbon dioxide gas to the interior of the block. As the gas undergoes a large increase in volume, it cools and contracts the assembly. Stopping or reducing the flow of carbon dioxide allows the apparatus to approach room temperature and thus the thermal expansion provides continuous advance of the embedded tissue towards the cutting edge.

Effective mounting of specimens is essential. The tissues are fixed, then dehydrated in an ethyl alcohol series by the usual cytological techniques. From absolute alcohol they are transferred to a solution containing equal parts of absolute alcohol and monomeric *n*-butyl methacrylate. After about one hour in the alcohol-monomer mixture, the tissue

is put in the monomer alone for an equal period. To ensure removal of the alcohol it is then placed in two additional changes of monomer for at least one hour in each before embedding in the polymer.

Gelatin capsules serve as convenient embedding moulds (Fig. 2). The main body of the capsule is set upright in a wooden block or other base and filled with the monomer, to which has been added 1 per cent (by weight) of a polymerisation catalyst (2,4-dichlorobenzoyl peroxide). After the tissue is placed in the mixture, the lid of the capsule is slipped on to retard evaporation. The assembled capsules are then suspended by strips of cellophane tape in an oven held at a temperature of 45° to 50° C.

After six or eight hours' heating, the monomer is polymerised into a solid matrix containing the tissue embedded at the bottom of the clear plastic. Several hours more at this temperature will ensure complete cure. The gelatin capsule may then be removed by soaking in water.

The embedded specimen is cemented into the mounting block with a mixture of pure gum rubber and paraffin. Then, with the thermal-expansion device clamped in the jaws of the microtome head, the entire assembly is cooled below room temperature (Fig. 3). Upon the appearance of a thin layer of frost on the metal, the

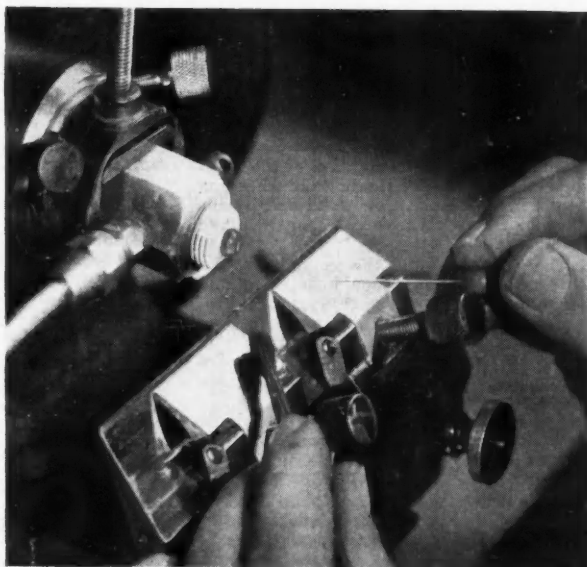


Fig. 3. Embedded tissue is shown mounted before the knife of a conventional microtome in the specimen-holding device. Thermal expansion of the specimen-holder, after it is cooled by compressed carbon dioxide gas, gradually and uniformly advances the specimen towards the knife

knife is adjusted just short of contacting the specimen on the cutting stroke. The specimen is then mechanically advanced at 2- or 3-micron increments until the first slice is made.

At this point the mechanical advancing mechanism of the microtome is disengaged and the gas flow reduced or stopped. The specimen then advances because of the thermal expansion of the metal holder. Some control of the rate of specimen advance can be obtained by bleeding the carbon dioxide at various reduced rates into the expansion chamber.

Although polybutyl methacrylate has excellent cutting properties, the cut sections usually are found to be somewhat folded. They are lifted from the knife by a dry camel's hair brush, picked up with a dissecting needle, and placed on a water surface warmed on a hot plate to about 35°C. After a period, ranging from a few minutes to an hour or more, many will flatten out on the surface. Those sections which are thin enough to show bright interference colours are then floated on to clean microscope slides and allowed to dry flat.

In preparing material for the electron microscope, the sections are floated from the water on to clean glass slides and dried flat. The matrix is then dissolved by placing the slide in acetone, toluene,

or amyl acetate. A dilute solution of collodion in amyl acetate is allowed to flow over the slide bearing the tissue, which is then permitted to dry at room temperature. The collodion film is floated from the slide on to water, and electron-microscope specimen screens are placed over the areas of the film containing the sections. The entire film is then floated from the plate to a larger volume of water, and the freely floating film, to which the specimen screens adhere, is removed from the water by flipping it over and out with a strip of short-fibred paper or a glass microscope slide.

Although the new method for obtaining very thin sections has given excellent results, it possesses certain limitations. The greatest chance for failure appears to lie in the polymerisation of the embedding mass. However, use of low-temperature catalysts and maintenance of a curing temperature of 45° to 50°C. will minimise such difficulties. Occasionally tissues are injured during the polymerisation reaction, but such tissues are easily detectable and can be promptly discarded.

On the whole, the new method makes possible the production of a high percentage of usable sections which have uniform thickness over a large area, and integrity of tissue structure.

Expressing Residual Values of Fertilisers

A CHANGE in existing methods of expressing residual values has been recommended by the Scottish Standing Committee for the Calculation of the Residual Values of Fertilisers and Feeding Stuffs in its report, now published by the Department of Agriculture for Scotland (HMSO, 6d.).

The suggestion of the committee was that residual values should be calculated by multiplying the percentages of nitrogen, phosphoric acid and/or potash in the original fertiliser by appropriate prices per unit (i.e., per 1 per cent of a ton) of N, P₂O₅ or K₂O and making appropriate adjustments.

Values per unit of nitrogen, phosphoric acid and potash were recommended as follows: nitrogen 10s.; phosphoric acid 5s.; potash 5s.

The value of residues of plant food in the original manure after one, two, or three growing seasons was calculated to be as follows: Nitrogen (a) in inorganic

manures, dried blood and dried poultry manure nil; (b) in other organic manures 5s. after one season; 2s. 6d. two seasons; nil, three seasons. Phosphoric acid 2s. 6d.; 1s. 3d.; 7¹/₂d. Potash 2s. 6d.; 1s. 3d.; and nil after one, two, and three seasons respectively.

Liming of land called for special attention, the committee considering that the present methods of assessing the residual value tended to underestimate the cumulative effects on fertility of applying moderate dressing at frequent intervals. The evidence was that small applications at frequent intervals were more beneficial than the application of the same total quantity of lime at infrequent intervals.

The effects of lime varied so much that any attempt to give a figure for the whole country would be arbitrary. The committee therefore recommended that a deduction of one-seventh of the net cost of liming (including delivery and spreading) should be made for each growing season since application.

MATERIALS FOR GERMAN CHEMISTRY

Wide Category Freed from Import Restriction

LISTS of commodities admitted into the German Federal Republic freely without quantitative restrictions, in accordance with the OEEC decisions, have been published by the West German Minister of Economic Affairs. They account for 69 per cent of all raw material imports. Among commodities of chemical interest included, are crude drugs and many other raw materials for the pharmaceutical industry, rosins, copals, gums, essential oils and raw materials for the distillation of essential oils, vegetable dyes, glues, many vegetable oils for the paint trade, tartar, crude phosphates, phosphorite, coprolite, apatite, pyrolusite, crude glycerin and lye, crude iodine, phosphorus phosphorus sulphides, casein, lecithin, natural rubber, gutta-percha, synthetic rubber, asbestos, various non-ferrous minerals and metals, burnt pyrites, grey zinc oxide, tin oxide, stannic acid, and rare earths and their metals and alloys, except uranium and thorium.

The list does not contain any substance of chemical interest of which appreciable quantities are produced in Western Germany but is likely to be extended as so far as it covers only 36 per cent of the total import value. OEEC decisions provide for the removal of quantitative restrictions from at least 50 per cent of the total import trade of the participating countries.

Sodium Chemicals and Oil

Although chemical production in Western Germany has not been increasing substantially in recent months, the market tendency remains easy. The five soda factories are reported to be working at 60-65 per cent of capacity on an average. Attempts to increase exports have been only moderately successful. The demand for soda from soap manufacturers and cellulose industry is now on a lower level and consumers generally are reducing their stocks. Soda imports, contracted under JEIA auspices while the shortage lasted, are still continuing.

The Shell oil refinery in Hamburg, Germany's largest refining plant, was reopened early in November. When in full production, the refinery will have a daily throughput of 440,000 tons of crude. The changeover from Venezuelan crudes as refined before the war to Middle Eastern oil has necessitated extensions to the deparaffination installations. The recon-

struction work still continues and is expected to require a total expenditure of about Dm.55 million by the end of 1950.

In a bid to limit the dismantling of the Fischer-Tropsch plants (THE CHEMICAL AGE, 61, 607), Ruhr-Chemie A.G. has submitted a plan to the Federal Chancellor, Dr. Adenauer, suggesting that if the total synthesis capacity cannot be retained, at least half—sufficient for 185,000 tons of primary products annually—should be left untouched.

The company, which speaks for a number of interests, argues that the gas generation and the processing plants should not be dismantled at all as they meet essential economic requirements. Dismantling is said to have been suspended, in accordance with an agreement between the French authorities and the Rhine-Palatinate Government, at the works of Seifenfabrik Siegert & Co., of Neuwied, which covers the bulk of the soap consumption in that area.

Expanding Potash Totals

West German potash exports in 1949/50 are scheduled to reach 100,000 tons, valued at about \$10 million, as compared with 57,000 tons in 1948/49 and 33,000 tons in 1947/48. This increase in export shipments goes hand in hand with an expansion of output—1,570,000 tons of crude salts in 1947 to 2.41 million tons in 1948 and 2.6 million tons in the first nine months of 1949.

By the end of this year, virtually all the extensions embarked upon in old potash works are to be completed. West German potash production will then run at an annual rate of 700,000 tons of K_2O , compared with 485,000 tons twelve months earlier. A further increase in potash production will be impracticable until the Königshall-Hindenburg works of the Burbach Kaliwerke A.G., which were flooded in 1939, reach the productive stage, probably early next year. Operations here will add nearly 100,000 tons of K_2O annually to the West German potash output.

Chilean Nitrate Price Out

Competition from synthetic nitrate has necessitated a price reduction of Chilean nitrate by the equivalent of U.S.\$8 per ton.

Developing Paint Manufacture in South Africa

Widely Increased Capacity and Variety

From OUR CAPE TOWN CORRESPONDENT

THE extremely widespread increase in South African capacity for producing paints and other surface coatings is one of the most prominent characteristics in recent industrial affairs.

A new firm of manufacturers of paint, varnish, enamel and distemper for decorative and industrial purposes recently commenced operations at East London with the policy of developing and making surface coatings particularly suited to local conditions. Because some raw materials are not yet available, a full range of its lines is not yet being manufactured, but the firm is stated to be capable of making almost every finish, except leather finishes and, for the time being, furniture lacquers.

* * *

Buffalo Paints, Ltd., Sydney Road, Durban, a firm closely associated with British Paints, Ltd., Newcastle-on-Tyne, plans to produce in its Durban factory the Torpedo brand of paint developed by the British company for marine use. Another line that will shortly be made in South Africa is Apexior boiler compound. The modern metal primer made in Durban has a zinc chromate base and is claimed to save up to 50 per cent of primer costs. It is also cheaper than red lead primers. Buffalo Paints, Ltd., has had the advantage of technical assistance from its British associate, which is stated to have improved the products and made possible the production of a wider range of paints in the Union.

* * *

A private company, the Emalux Manufacturing Co., P.O. Box 5281, Johannesburg, is being formed to make a glazed wall surfacing, which is to be offered as an alternative to tiles, wood panelling or paint, with a ten-year guarantee against wear. It is claimed to be resistant to the effects of oil, grease and fat, to be waterproof and easily cleaned. The company also intends to make paint for exterior protection of walls. At present it has factories in Johannesburg, Cape Town and Durban.

* * *

Elvic Products (Pty.), Ltd., 269 Point Road, Durban, is now producing a com-

plete range of nitrocellulose lacquers and allied materials for use in car spraying and the furniture industries, including rubbing compounds, masking paste, clear lacquers, clear sealers, metal primers, synthetic lacquers and enamels, and enamel thinners.

* * *

Other paint manufacturing companies recently registered in the Union are Dimanol & Co. (Pty.), Ltd., paint and white lead manufacturers, Booysens, Station Road, Johannesburg, and Chemical Utilities (Pty.), Ltd., 34 Betty Street, Jeppe, Johannesburg, makers of cellulose nitrate lacquers for wood and metal paints.

* * *

Silicon Chemicals, Ltd., is using its new Klipfontein factory for the production of organo-silicon compounds and such chemicals not previously made in the Union as ferric chloride and chloroform. In association with Rely Paint & Metal Works, Ltd., it is planned to produce fireproof paints and building preservatives. The company is also to supply media for heat transfer and silica preparations regularly used in such industries as plastics, rubber and textiles.

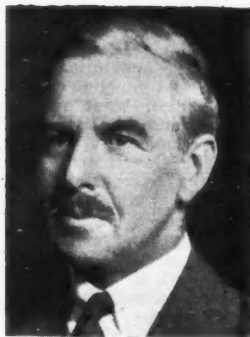
* * *

The production of explosives in the Union reached the record monthly total of 198,000 cases, or 5000 tons, during August, and extensions to the existing chemical and explosives plant, which it is hoped will be completed in 1952, are planned to raise its annual output of ammonium nitrate to 26,000 tons.

* * *

Fireworks are now being made in a factory near Cape Town. In recognition of the shortage of English fireworks, caused by import control, maximum production has been maintained. The factory could, however, have disposed of much more than its present output and it has been necessary to ration supplies to wholesalers. In spite of import restrictions and the lack of certain chemicals, the factory has produced more than £20,000 worth of goods for the home and export markets.

PERSONAL



ROYAL SOCIETY MEDALLISTS

Left: Prof. R. A. Peters,
F.R.S. (Royal Medal). Right:
Prof. A. R. Todd, F.R.S.
(Davy Medal)



PROF. HUGH BRYAN NISBET has been appointed principal of the Heriot-Watt College, Edinburgh, in succession to Principal J. Cameron Smail who is due to retire in March next year. The professor, who is 47, was demonstrator and later lecturer in chemistry at the college, and in 1946 succeeded the late Prof. T. Slater Price in the chair of chemistry. He served as a member of the Chemistry Advisory Board and of the committee to report on the training of fuel technologists set up by the DSIR. His researches have ranged from the study of local anaesthetics, antimalarial and bactericidal drugs, to studies on motor spirits of high octane numbers.

The personal library of the late Dr. J. COLVIN, senior lecturer in inorganic and physical chemistry at Leeds University, is being presented to the university chemical department as the nucleus of the library equipment of a room, to serve as a memorial to him, which is to be set aside as a common room for students. A Colvin Memorial Fund is also being opened, which it is hoped may provide sufficient endowment to buy additional books every year.

MR. GILBERT WAY, planning manager at Fort Dunlop, has been appointed chief planner for the Fort Dunlop group of factories in succession to Mr. A. T. ROBERTSON who has undertaken the post of works director of Dunlop South Africa, Ltd. MR. W. J. BARTON, of the production planning department at the Fort, has been promoted its planning manager in succession to Mr. Way.

The British Road Tar Association announces that COLONEL H. C. SMITH, deputy chairman of the Gas Council, has been re-elected president of the association for the third year in succession. MR. G. A. HEEDEN, director and general manager of the South Yorkshire Chemical Works, Ltd. (coke oven interests) and MR. STANLEY ROBINSON, chairman and managing director of the Midland Tar Distillers, Ltd., were re-elected vice-presidents, and MR. W. K. HUTCHISON, chairman of the South Eastern Gas Board, was re-elected the hon. treasurer. The chairman of the managing council is MR. J. DAVIDSON PRATT (Association of British Chemical Manufacturers).

Part of the University of Liverpool's new physics laboratory at Mount Pleasant, which will be used eventually for nuclear physics research, has been completed. DR. J. ROTBLAT, in the absence of PROF. H. W. B. SKINNER, professor of physics, performed the opening ceremony. The first section of the laboratories will be used for administrative purposes until the premises are opened next year after the erection of a 1500-ton cyclotron. Prof. Skinner, who is deputy scientific officer at Harwell atomic energy establishment, is engaged on part-time duties at the university. He is to move permanently to Liverpool in the New Year.

MR. G. A. S. NAIRN, chairman of Lever Bros. (Port Sunlight), Ltd., has been elected chairman of the board of governors of Liverpool Collegiate School.

(continued overleaf)

PERSONAL

(continued from previous page)



M. Léon Flamache, director of the newly established Anglo-Belgian plastics undertaking, the formation of which by I.C.I., Ltd., and the Solvay company is announced on page 696

PANDIT NEHRU, India's Prime Minister, has had a private meeting with LORD MCGOWAN, chairman of Imperial Chemical Industries, Ltd. They are understood to have discussed the development of fertilizer production in India.

DR. O. H. MAVOR (James Bridie) will be the chairman and will propose the toast of "The Profession of Chemistry" at the Ramsay chemical dinner to be held in Glasgow on December 2.

DR. JOHN LONG, of Imperial Chemical Industries, Ltd., has been adopted by the Hartlepool Liberal Association as prospective candidate.

Obituary

A NOTE from the Textile Institute recalls that the recent death of Mr. GEORGE MOORES, F.T.I., Wilmslow, Cheshire, at the age of 87, severs one of the few remaining links with the foundation of the Textile Institute 40 years ago. With the late Mr. J. H. Lester, of Manchester, Mr. Moores was jointly responsible for the beginning of the movement which led to the founding of the institute in 1910, with 150 members. He was the institute's first general secretary and remained in office from 1910 to 1914.

The death has occurred of Mr. ARTHUR JENNER CHAPMAN, F.R.I.C., analytical and consulting chemist, at his home at Chalfont St. Giles, Bucks. He was 76 and had retired some 15 years ago. Mr. Chapman was a member of the Radium Lodge of Freemasons.

PARLIAMENTARY TOPICS

Steel Bill Postponed

THE certainty that the Iron and Steel Bill will not be put into effect until after the next Parliamentary Election was assured by a Government amendment in the House on Wednesday. The effect of this was to postpone the appointment of members of the Iron and Steel Corporation until October 1, 1950. That agrees, in its effect, with the House of Lords proposal that the Bill should not operate until that date. The Government has proposed as the vesting date January 1, 1951.

REPLYING to questions from Mr. J. Lewis regarding imports of carbon black and its production in this country, the President of the Board of Trade (Mr. Harold Wilson) stated in a written answer that in the first six months of this year 14,279 tons of carbon black from natural gas and 2498 tons of other blacks had been imported at a value of just over £1 million. Production of carbon black had already begun in one factory in this country and two others were in process of construction. On completion of the three plants it was hoped that their total output would supply about half this country's requirements.

SATISFACTION with the progress of exploratory work in connection with Yorkshire potash was expressed by the President of the Board of Trade in a written answer to Mr. E. G. Willis. The Minister stated that he did not consider any special steps regarding potash were necessary at present.

QUESTIONED by Sir Patrick Hannon about the ECA technical assistance programme, Mr. Herbert Morrison stated that the supply of foreign technical publications had recently been authorised by the U.S. authority and the first batch was now being obtained.

Interpreting Research Results

WITH the object of facilitating the application to industry of successful developments of scientific research, the British Welding Research Association has recently appointed a team of development and liaison engineers to interpret the association's research results. Mr. A. J. HIPPERSON, who leads the team, was for many years with the welding advisory service and has been with the BWRA since its inception. His staff includes Mr. R. G. BURT, Mr. C. C. BATES, and Mr. P. M. TEANBY, who was a member of the association's research staff.

Technical Publications

USEFUL data concerning the properties, temperature coefficient, thermal conductivity and mechanical properties of electrical resistance alloys are given in a new brochure "Red Fox Electrical Resistance Alloys" (S.F.243), issued by Samuel Fox & Co., Ltd., Sheffield, on behalf of the United Steel Companies, Ltd. The brochure also covers fundamentals of electrical heating, winding of helical coils, temperature conversion tables, etc., and is handsomely produced and illustrated.

* * *

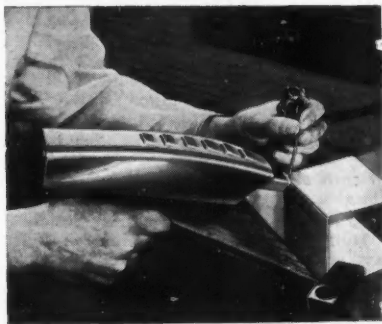
INDUSTRIAL chemistry has so many aspects that a classified list of chemicals and their manufacturers is continually required. A work which helps to supply the need is the revised edition of the "Chemical Manufacturers' Directory," 1949, now available. The directory, which has been published uninterruptedly for 81 years, covers England, Wales and Scotland, some firms in Ireland and also lists the chemical brokers and agents in London. The price is 5s. 6d., post paid 6s., Simpkin Marshall (1941), Ltd.

* * *

THE techniques of construction and operation of the electron microscope and its use in the testing of materials, is the subject of a new manual just released by the Office of Technical Services of the U.S. Department of Commerce. The manual, prepared to assist in the training of U.S. Air Force technicians, is a basic introduction to the nature of the electron microscope, and its contribution to various types of materials problems. In addition to a theoretical discussion of the problem of image resolution, it provides practical information on the construction and operation of the instrument, and the preparation of replicas and specimens. The 48-page report also contains a number of photomicrographs as well as graphs and illustrations. Copies of the manual (No. PB-97957), "The Electron Microscope and Its Application to Materials Problems," (\$1.25 each), may be obtained from the U.S. Department of Commerce.

* * *

LIGHTNESS consistent with required strength is essential for portable tools and machine tools used in mobile workshops. The advantages of the strength/weight ratio of aluminium are pointed out in "The Aluminium Courier," published by The Aluminium Development Association.



[Courtesy, Mullard Electronic Products, Ltd.]

This ultrasonic soldering iron (type E7587) developed in the Mullard Electronic research laboratories consists essentially of a removable copper soldering bit and a magnetostriction transducer. By temporarily destroying the oxide film and providing a clean surface, ultrasonic stimulation facilitates the soldering of aluminium and other metals which form refractory oxides.

THE necessity for the measurement of illumination as distinct from its estimation has greatly increased in recent years, and new technique has involved the use of a number of unfamiliar terms. Some of the more important of these photometric terms have been listed for information by Everett Edgecumbe & Co., Ltd., London, in its latest catalogue sheet (471/4908). Portable dynamometer wattmeters, both precision and industrial models, are described and illustrated.

* * *

INFRA-RED heating for the drying or treatment of powdered chemicals, and in a wide range of applications both for thermosetting and thermoplastics materials in the plastics industry are described in a new booklet "Infra-red Heating" now available from The General Electric Co., Ltd., London. Among the processes described and illustrated are heating of thermoplastic sheet, gelation or fusing of plastic coated fabric, heating of PVC or PVC-coated fabrics prior to embossing, drying or pre-warming of thermoplastic powders and chips prior to extrusion, moulding and heating of thermosetting pellets, flake or powder prior to moulding.

Next Week's Events

TUESDAY, NOVEMBER 22

Institution of Chemical Engineers

London: Burlington House, Piccadilly, W.1, 5.30 p.m. (With Chemical Engineering Group, SCI). N. Swindin: "Recent Developments in Submerged Combustion."

The Royal Institute of Chemistry

Welwyn Garden City: The Cherry Tree, 8 p.m. (With Welwyn Garden City Scientists' Club.) M. P. Balfe: "Leather: Its Constitution and Properties."

Hull Chemical and Engineering Society

Hull: Prof. Paul G. Espinasse: "The Evolution of Clockwork in Relation to its Social Background."

WEDNESDAY, NOVEMBER 23

Society of Chemical Industry

London: 11 Chandos Street, Cavendish Square, W.1, 6.15 p.m. (Microbiological Panel). E. B. Anderson and L. J. Meanwell: "Recent Work on the Bacteriology of Pasteurisation."

Institute of Physics

London: Royal Institution, Albemarle Street, W.1, 5 p.m. (With Royal Meteorological Society.) Dr. A. R. Meetham (Fuel Research Station, Greenwich): "Physics of Atmospheric Pollution."

Institute of Fuel

Chester: The Refectory, the Cathedral, 6.30 p.m. A. D. Cummings: "A History of Fuel Technology."

Manchester Literary and Philosophical Society (Chemical Section)

Manchester: Portico Library, Mosley Street, 5.45 p.m. J. K. Luke: "Plastics."

Society of Instrument Technology

Manchester: Reynolds Hall, College of Technology, 7.30 p.m. C. H. Gregory: "Control Rooms for Chemical and Oil Plants."

Manchester Metallurgical Society

Manchester: Engineers' Club, Albert Square, 6.30 p.m. J. C. Chaston (Johnson Matthey & Co., Ltd.): "Powder Metallurgy (other than carbides)."

Royal Statistical Society

Birmingham: Chamber of Commerce, New Street, 6.30 p.m. T. V. Matthew: "The Extension of Statistical Methods in Production Engineering."

Newcastle-on-Tyne: Chemical Industries Club, 18 Louvain Place, 6.30 p.m. Dr. B. P. Dudding: "The Presentation of Sampling Data as a Guide to Executive Action."

THURSDAY, NOVEMBER 24

The Royal Institute of Chemistry

Gillingham: Medway Technical College, Gardiner Street, 7.30 p.m. Brains Trust. "The Chemical Protection of Crops." Manchester: Engineers' Club, Albert Square, 6.30 p.m. Dr. W. G. Grace: "Forensic Medicine."

Society of Visiting Scientists

London: 5 Old Burlington Street, W.1, 7.30 p.m. "Science in the Detection of Crime." Chairman: Prof. Sir Sydney Smith. Speakers: H. S. Holden, Keith Simpson and F. G. Tryhorn.

Society of Dyers and Colourists

Manchester: Reynolds Hall, College of Technology, 6.30 p.m. (Junior Branch.) "Some Observations on the Dyeing and Finishing of Cellulose Acetate and Cellulose Acetate Mixture Fabrics."

FRIDAY, NOVEMBER 25

The Chemical Society

Exeter: Washington Singer Laboratories, Prince of Wales Road, 5 p.m. (With RIC and SCI). Dr. U. R. Evans: "Corrosion Inhibitors."

Glasgow: University, 7.15 p.m. Sir John Lennard-Jones: "Modern Theories of Chemical Valency."

Newcastle-on-Tyne: King's College, 5 p.m. Reading of original papers.

Southampton: University College, 5 p.m. Prof. W. T. Astbury: "Macromolecular Studies with the Electron Microscope."

Institute of Metals

Sheffield: Mappin Hall. (With Electrodepositors' Technical Society.) A. T. Steer: "The Effect of Cold Working and the Influence of Surface Preparation on the Quality of Silver Deposition."

SATURDAY, NOVEMBER 26

Institution of Chemical Engineers

Birmingham: University, Edmund Street, 3 p.m. J. A. McWilliam: "Corrosion Resisting Steels for the Chemical Industry."

Acetic Anhydride Costs £9 More

Sterling devaluation is cited by British Industrial Solvents, Ltd., as the factor necessitating the increase, last week, in the price of acetic anhydride of £9 per ton.

HOME

B.O.C. Extending

The British Oxygen Co., Ltd., is erecting a new factory at Ystrad Road, Swansea.

Fuller Overseas Trade in October

United Kingdom exports for October were provisionally announced as £156.1 million, an increase of £14.1 million over the previous month, and only £3.9 million short of the March record. These figures were given by the President of the Board of Trade in London last week. Imports were provisionally stated to have been £198.2 million, an increase of £17.1 million above the September total.

Increased Coal Production

Britain's aggregate output of coal last week again showed an increase over the corresponding week of last year, although coal-mining manpower is now lower than it has been for more than two years. Comparative production figures are:—Last week: 4,467,700 tons (4,241,700 tons deep-mined, 226,000 tons opencast). Corresponding week of last year: 4,309,000 tons (4,103,700 tons deep-mined, 205,300 tons opencast).

Chemists Not Guilty

The Pharmaceutical Society of Great Britain has commented on a statement by the Bishop of Chelmsford in the Chelmsford Diocesan Chronicle referring to the use of automatic machines outside chemists' shops for the sale of contraceptives. The society observes that its disciplinary machinery is available to deal with any conduct of this kind by chemists and that, although there are more than 14,000 chemists shops, only one authenticated case in which a chemist has been involved has been brought to the Society's notice. Appropriate action was taken in that case.

Metal Controls Amended

By an order which came into force on November 15, the Minister of Supply has consolidated all previous control of non-ferrous metals (copper, lead and zinc) orders; freed from control the acquisition and disposal of copper and zinc scrap; and revoked the old statutory maximum prices of copper, lead and zinc. Licences will still be needed for scrap lead because the rationing scheme still operates, and for unwrought forms of the three metals. The prices at present in force are not changed, but the margin for copper rods and the extra charges for small lots are increased.

Alkali Workers' Memorial

A memorial plaque on stone was unveiled at the Castner Kellner alkali works, Weston Point, Runcorn, on November 11, to 31 men who lost their lives in the war.

More Free Imports

The provision of open general licences for the importation of arsenious oxide and white arsenic, rape seed oil, unmanufactured cotton waste and a variety of wool products, as from November 22, is announced by the Board of Trade. This implements the current scheme of multi-lateral relaxations of restrictions and relates only to the countries participating in the agreement.

Mersey Rubber Fire

The disastrous fire which broke out last week in a rubber warehouse in the Liverpool docks, was considered to be the largest single fire there had been in Dockland. All the goods in the warehouse were due to go to New Zealand and Australia. The fire was still burning this week, when damage was estimated at over £2 million. Dr. J. B. Firth, director of the Home Office Forensic Science Laboratory at Preston, has been called in to investigate the cause of the fire.

Soap Makers' New Control

A controlling interest in the business of Peter Lunt, Ltd., soap manufacturers, Aintree, Liverpool, has been acquired by Griffiths Hughes, Ltd. Mr. J. H. Wootton-Davies, industrial chemist, who was a Government adviser on oils and fats during the first world war, remains chairman of the Lunt company. He has a long connection with the industry, as manager of several departments of the Lever Brothers group, before building up the present business of Peter Lunt to its present scope.

Census of Production

An order prescribing the matters about which persons may be required to furnish returns for the Census of Production to be taken in 1950, in relation to the year 1949, has been made by the Board of Trade to come into operation on December 31, 1949. The order exempts undertakings concerned with the production of coal, gas, electricity, oil shale, crude or refined petroleum or shale oil products from making returns of information they already supply to the Ministry of Fuel. The order is "The Census of Production (1950) (Returns and Exempted Persons) Order, 1949" (S.I. 1949, No. 2053) (1d.).

OVERSEAS

New W. German Oil Port

One of the largest projects attempted in Western Germany for a number of years is the expansion into a modern oil port of the Duisburg oil tank farm of the German-American Petroleum Co., Ltd., at Duisburg. The installations will cover about 90,000 sq. m. and will become Germany's second largest oil port after Hamburg.

Australian Rayon Plans

Courtaulds, Ltd., has announced that negotiations to establish the first units of a rayon industry in Australia are well advanced. It is intended to form a company with a nominal capital of £A10,000,000, which will build factories for the production of both viscose rayon yarn for tyres and other industrial purposes, and acetate rayon yarn for textile purposes.

Mining Progress in Malaya

Malayan tin ore production during January-June, 1948, amounted to 35,287 tons, and coal output for the same period reached 193,116 tons. Other branches of the mining industry have shown similar progress. Additional evidence of mining development in Malaya is apparent from the tin production figure, which showed a yield of 643 tons during June.

Pure Hydrocarbons from Italian Petroleum

Profs. V. Berti and G. Leidi state that they have succeeded in extracting pure methyl-cyclohexane and toluene from petroleum found in Italy. They used a cut of petrol obtained from Italian crude and separated it at a temperature ranging between 204° and 220°F. into paraffinic, naphthenic and aromatic fractions. A successive rectification yielded pure methyl-cyclohexane and toluene.

Potential £10 million for Manganese

At the African Regional Scientific Conference held in Johannesburg, Dr. T. J. W. Jorden, of the S. African Iron and Steel Corporation, criticised what he described as the "Union's suicidal policy of exporting its rather limited supplies of high grade manganese ore." Discussing the local use of raw material in the ferrous metallurgical industry, he said, "It has been estimated that conversion of this exported ore to ferro-manganese in the Union would have enhanced its value sixfold, and at present export rates would earn around £10 million in foreign exchange a year."

Rubber Surfacing of Roads

The feasibility of using rubber for road surfaces in Ceylon is engaging the attention of the Government. A comprehensive report on the subject is being considered prior to the experimental stage. Large scale use of powdered rubber is envisaged.

Indian Thorium Enterprise

The Government of India has signed a 15-year agreement with two French firms—the Banque Marocaine de Credit and the Société de Produits Chimiques des Torres Rares—permitting them to exploit and process the monazite sands occurring on the coast of Travancore State. The plant is to be staffed by Indians, who will be trained in France.

Norwegian Superphosphates

The Norwegian Zinc Company's superphosphates factory at Odda will begin production next week, first at the rate of 20,000 tons a year, increasing to 40,000 tons, and ultimately to 80,000 tons. This new factory, together with the Lysaker Chemical Factory which produces 35,000 tons, should supply over half Norway's annual demand for superphosphates—this year about 150,000 tons and about 170,000 tons in 1950.

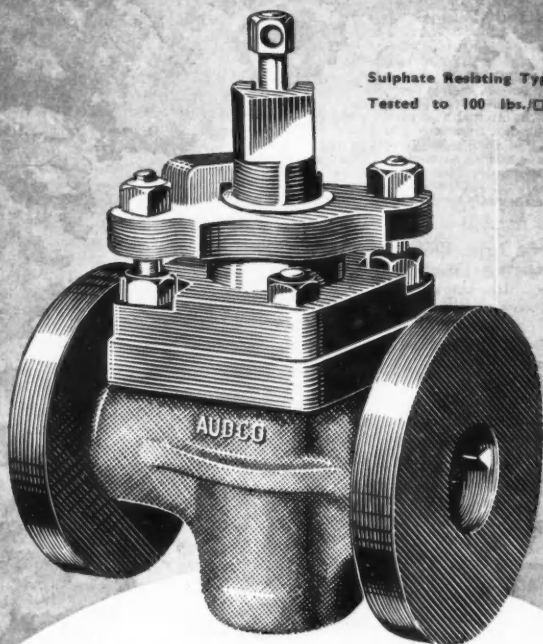
British and U.S. Toolmaking

Addressing the annual convention of the National Tool and Die Manufacturers' Association in New York City, a British visitor, Mr. E. Slater, of Wakefield, said that British tool and die makers were more advanced than American tool shops in export sales and in making tools for deep stamping work. Despite lowered costs of tooling, however, British tools and dies will not compete economically against American shops. He cited the lack of standardised production in the British workshops.

Scientific Equipment via Unesco

A recommendation to the director general of UNESCO that the scheme to enable member countries to escape currency and customs duties in purchasing essential literature should be extended to scientific equipment and educational films was made at the fourth general conference of the international organisation in Paris last month. Good reports of the book coupon scheme were presented, which was stated to have been of real value to scientists and scholars during the past year.

SEALED AGAINST LEAKAGE— PROTECTED AGAINST CORROSION



Sulphate Resisting Type S.R.
Tested to 100 lbs./sq. in. Air

The Audco Type S.R. valve is specifically designed for use on Sulphuric Acid of concentration above 70%. The seats of the plug and body are specially treated to resist sulphation. The first type S.R. valve was installed in October 1942 and is still working perfectly. This is just an example of AUDCO'S ATTENTION TO DETAIL.

AUDCO
Lubricated
VALVES

AUDLEY ENGINEERING CO. LTD., NEWPORT, SHROPSHIRE, ENGLAND

Law and Company News

Commercial Intelligence

The following are taken from the printed reports, but we cannot be responsible for errors that may occur.

Mortgages and Charges

(Note.—The Companies Consolidation Act of 1908 provides that every Mortgage or Charge, as described herein, shall be registered within 21 days after its creation, otherwise it shall be void against the liquidator and any creditor. The Act also provides that every company shall, in making its Annual Summary, specify the total amount of debt due from the company in respect of all Mortgages or Charges. The following Mortgages and Charges have been so registered. In each case the total debt, as specified in the last available Annual Summary, is also given—marked with an *—followed by the date of the Summary, but such total may have been reduced.)

QUICKSET PRODUCTS, LTD., London, S.E., manufacturing chemists (M., 19/11/49.) October 19, charge, to Barclays Bank, Ltd., securing all moneys due or to become due to the bank; charged on 55 Leroy Street, London. *Nil. October 14, 1948.

SOLARTRON LABORATORY INSTRUMENTS, LTD., Kingston-on-Thames. (M., 19/11/49.) October 25, £2000 debentures, part of a series already registered.

F. H. STEELE & CO., LTD., Dublin, manufacturing chemists. (M., 19/11/49.) October 17, £5000 debentures; charged on 22 Brookfield Avenue, Blackrock, Co. Dublin, also general charge. *Nil. March 17, 1949.

Satisfactions

AERASPRAY MANUFACTURING CO., LTD., Birmingham, spraying plant manufacturers. (M.S., 19/11/49.) Satisfaction October 21, of charge registered September 8, 1947.

COPPER & ALLOYS, LTD., West Bromwich. (M.S., 19/11/49.) Satisfaction October 26, of mortgage registered December 17, 1947 (fully).

PEEL LABORATORIES, LTD., London, N., chemists, etc. (M.S., 19/11/49.) Satisfaction October 26, of debtors registered May 15, 1947, to the extent of £752 lrs. 4d.

Receivership

CREST LABORATORIES, LTD., 443 Bury New Road, Salford, 7. (R., 19/11/49.) Mr. Ronald F. Bendall, 31 Lloyd Street, Manchester, 2, ceased to act as receiver and manager on October 29.

Company News

Evans Medical Supplies, Ltd.

The directors of Evans Medical Supplies, Ltd., propose to increase the authorised capital of the company from £450,000 to £1 million and are to abrogate the participating rights of the 6 per cent preference stockholders. As compensation, it is intended to issue to preference stockholders 5s. of new ordinary stock for every £2 of preference stock now held. This will involve the capitalisation of £30,225 of reserves.

The increased authorised capital will comprise: £250,000 of £1 preference stock, £150,000 of £1 unclassified shares, £200,000 of 5s. ordinary stock, and £400,000 of 5s. unclassified shares. The directors will declare, on December 31, an interim dividend of 3 per cent on the ordinary stock.

Chemical Employment

A FURTHER slight increase in the numbers employed in the chemical industry and allied trades in Great Britain in August is shown by statistics published in the October issue of the *Ministry of Labour Gazette*.

Figures, showing sectional distribution, are as follows:—

	Thousands		
	August, 1949	July, 1949	Mid 1948
Coke ovens and by-product works	17.6	17.6	17.3
Chemicals and dyes	197.9	196.5	195.5
Pharmaceutical preparations, etc.	33.8	33.6	30.8
Explosives and fireworks	36.2	36.1	33.8
Paint and varnish	38.1	38.0	37.0
Soap, candles, glycerine, etc.	49.0	48.7	46.9
Mineral oil refining	35.4	34.8	30.7
Other oils, greases, glue, etc.	30.3	29.8	28.9
Total, chemical and allied trades	438.3	435.1	420.9

Canadian Acquisition

The recently formed subsidiary of the Standard Chemical Co., Ltd., Chemical Developments of Canada, Ltd., has acquired all the capital stock of Irwin Dyestuff Corp., Ltd., Montreal, the former subsidiary of Dominion Rubber Co., Ltd. Irwin Dyestuff Corp. is the distributor in Canada of the General Aniline & Film Corp.



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The Stock and Chemical Markets

STOCK markets have again been dominated by the trend in British Funds, which improved sharply on balance, the rally having been inspired by official support from the Government broker. The recovery has so far been held without further evidence of direct official support.

Rally in Gilt-edged helped other sections of markets, particularly leading industrials, but buyers continued to show considerable caution and chemical and allied shares generally moved narrowly. Imperial Chemicals, after being down to 41s. 9d., rallied to 42s. 3d. Monsanto 5s. ordinary eased to 50s., Albright & Wilson were steady at 30s., Boake Roberts 28s. and Brotherton 10s. shares 19s. 3d.

Elsewhere, Laport Chemicals 5s. units were 9s. 6d., but Amber Chemical fell to 4s. 3d. Bowman Chemical 4s. shares were 6s. 9d., F. W. Berk 13s. L. B. Holliday $\frac{1}{2}$ per cent preference were 20s. 3d., and British Chemicals & Biologicals 4 per cent preference 18s. 9d. Pest Control 5s. shares changed hands around 8s. $\frac{1}{2}$. Turner & Newall firmed up to 72s., and United Molasses were around 36s. 6d.

The 4s. units of the Distillers Co. have been active around 16s. 6d. "ex" the share bonus, while the new shares, which are £1 units (later to be "split" into 4s. units), were dealt in between 80s. and 88s. Firmness at 57s. 6d. was shown by Borax Consolidated. Dunlop Rubber improved to 61s.

British Glues & Chemicals 4s. units were 17s. Amalgamated Metal at 18s. were little changed following the reopening of the London Metal Exchange for the first free dealings in tin since the war. British Aluminium kept at 40s. There was less uncertainty in shares of companies connected with plastics, British Xylonite rallying to 53s. 9d., while Kleemann were 9s., De La Rue better at 21s. 3d. and British Industrial Plastics 2s. shares steady at 4s. 9d. Electric equipments firmed up, particularly G.E.C. at 72s. 6d.

The Government decision to postpone the take-over and vesting dates for nationalisation until after the General Election helped iron and steel shares. Hadfields rose to 26s. 6d., Dorman Long were 28s. 9d. (the results are imminent), with Colvilles at 32s. 6d. and Thomas & Baldwins 13s. 9d. United Steel rose to 27s. and Stewarts & Lloyds have been firm at 52s. 3d.

Boots Drug at 48s. 6d. moved in favour of holders, Beechams deferred were better at 14s. 1½d. with British Drug 5s. shares at 6s. 9d. Lever & Unilever at 41s. 6d. failed to hold an earlier rise. Fisons improved to 28s. Oil shares were uncertain. Anglo-Iranian changing hands slightly below £7, while Shell were 66s. 3d., but Burmah firmed up to 53s. 9d. and Trinidad Leaseholds were 25s. 1½d. on the full results. Further improvement in Apex (Trinidad) 5s. shares to 35s. 7½d. reflected hopes that the forthcoming dividend will be maintained.

Market Reports

ON the whole, trading on the industrial chemicals market continues fairly briskly with few important price changes to record. The movement to the home consuming industries is well maintained at recent levels and a fair amount of inquiry for shipment has been in circulation. Zinc oxide is reported to be 30s. per ton dearer and acetic anhydride prices have advanced by £9 per ton. A steady demand continues for most of the soda compounds and firmness characterises the position of the potash chemicals. Formaldehyde, hydrogen peroxide, bleaching powder and the barium compounds are other items in good request, while the non-ferrous metals are attracting a fair amount of attention. Some improvement in conditions is apparent on the coal tar products market and buying interest has increased for most items. There is a good outlet for cresylic acid at competitive rates and phenol is moving well.

MANCHESTER.—Prices are steady or firm in nearly all sections of the Manchester chemical market, although not much in the way of fresh movement has occurred during the past week. Home trade deliveries of most of the leading heavy chemicals, especially to the bleaching, dyeing and finishing sections of the cotton trade, have been on a good scale and a fair amount of fresh inquiry has been reported, with steady replacement buying. Export business has been around its recent levels. Among the tar products there has been a small improvement in cresylic acid and several other "dull" lines.

GLASGOW.—In the Scottish chemical market the supply position is fairly satisfactory, except in the case of Glauber salts (commercial and desiccated), which continue to be very scarce.

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Patent Processes in the Chemical Industry

The following information is prepared from the Official Patents Journal. Printed copies of specifications accepted will be obtainable, as soon as printing arrangements permit, from the Patents Office, Southampton Buildings, London, W.C.2. at 2s. each. Higher priced photostat copies are generally available.

Complete Specifications Accepted

Manufacture of fibrous glass combined with synthetic resinous material.—A. P. Thurston. (Owens-Corning Fibreglass Corporation). May 24, 1946. 630,190.

Manufacture of intermediates in the synthesis of adrenal cortical hormone.—Merck & Co., Inc. July 14 1945. 630,076.

Processes for preparing pure alkali metal salts of penicillin and the product resulting therefrom.—Commercial Solvents Corporation. Sept. 4 1945. 630,254.

Beta-(heterocycloethio)-carboxylic acids and method of preparing same.—B. F. Goodrich Co. Oct. 5 1945. 630,081.

Refining of heavy hydrocarbons.—Anglo-Iranian Oil Co., Ltd., F. W. B. Porter, and J. W. Hyde. Sept. 6 1946. 630,204.

Production of d, l-methionine.—Merck & Co., Inc. Oct. 10 1945. 630,139.

Production of gelatine solutions and photographic emulsions of increased viscosity.—General Aniline & Film Corporation. Nov. 24 1945. 630,016.

Synthetic resins.—Mississippi Valley Research Laboratories, Inc. Oct. 10 1945. 630,258.

Adhesive resinous compositions.—B. F. Goodrich Co. Dec. 27 1943. 630,140.

Method and apparatus for distilling carbonaceous material.—V. F. Parry. Nov. 4 1946. 630,142.

Heat treatment of magnesium base alloys.—Aluminum Co. of America. Aug. 31 1944. 630,211.

Manufacture of interpolymers of styrene with polymeric fatty acid esters and coating compositions obtained therefrom.—L. Berger & Sons, Ltd., L. E. Wakeford, F. Armitage, R. H. Buckle, and E. Booth. [Legal representatives of D. H. Hewitt (deceased)]. Dec. 6 1946. 630,022.

Froth flotation of copper sulphide minerals.—American Cyanamid Co. Jan. 4, 1946. 630,213.

Preparation of powdered metallic oxides into modules.—H. W. K. Jennings. (Brassert & Co., H. A.) Dec. 16 1946. 630,089.

Process of preparing esters of penicillin G.—Merck & Co., Inc. Dec. 20 1945. 630,264.

Removal of water from tetrahydrofuran.—I.C.I. Ltd., J. G. M. Bremner, R. R. Coats, and M. A. E. Hodgson. Jan. 3 1947. 630,149.

Hardening of proteinaceous substances.—BX Plastics, Ltd., and S. H. Pinner. Jan. 8 1947. 630,150.

Refractory articles and their manufacture.—Carborundum Co. Jan. 12 1946. 630,268.

Production of resinous articles.—I.C.I., Ltd., R. M. C. Arnot, and R. Hammond. Jan. 29 1947. 630,026.

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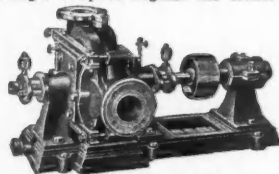
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None of the vacancies in these columns relates to a man between the ages of 18 and 50 inclusive, or a woman between the ages of 18 and 40 inclusive, unless he or she is exempted from the provisions of the Control of Engagement Order, or the vacancy is for employment exempted from the provisions of that order

A Major Manufacturing Company with works throughout Great Britain requires a **SENIOR SITE ENGINEER**. Applicants should be aged 30-40 and have held responsible posts dealing with the installation of chemical plant and services. Must be capable of co-ordinating all work on site and controlling labour. A practical knowledge of high pressure gas compressing equipment an advantage. This vacancy offers excellent opportunities for promotion to men prepared to be resident on sites in Great Britain during periods of development and installation. Reply giving full details of age, qualifications, and experience to: Dept. M.36, Box X4518, A.K. Advtg. 212a, Shaftesbury Avenue, London, W.C.2.

APPLICATIONS are invited from **QUALIFIED ENGINEERS**, B.Sc. or A.M.I.Mech.E., for important **Chemical Works, Manchester area**.

Applicants should not be over 40 years of age, and have experience in **Maintenance, Chemical Plant Erection and Design**. Position offered is permanent and progressive. Only men of proved ability need apply. Address in the first instance, with particulars of qualifications, experience in detail, and salary expected. Box No. 2872, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

COMPANY near London invites applications from Graduates, preferably with some experience in Organic or Physical Chemistry, for **RESEARCH IN SYNTHETIC RESINS**. Write, giving full particulars and salary required to Box No. 2870, THE CHEMICAL AGE, 154, Fleet Street, London, E.C.4.

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A prominent firm of **Chemical Engineers** in S.W. London have a vacancy in their research laboratories for an **ANALYST**. Candidates should have had a sound scientific training, together with some years' experience of commercial analysis. Experience of metallurgical analysis would be a recommendation but is not essential. The commencing salary would depend upon age, and experience but would not be less than £400 per annum. A pension scheme is in operation. Conditions of work accord and publication of the results of original research in analytical chemistry is encouraged. Write Box No. X 3040, BENSONS, Kingsway Hall, London, W.C.2.

MINISTRY OF SUPPLY invites applications from **CHEMISTS** for unestablished posts in **Experimental Officer Class in Research and Development Establishments**, mainly in S. England.

Candidates must possess Higher National Certificate or Higher School Certificate, or equivalent. General chemical experience, particularly in the fields of Physical Chemistry and Chemical Engineering, is required. Special knowledge or interest in any of the following fields would be an advantage: Modern Analytical Methods; Thermo-Chemistry and Combustion; Stability and Sensitivity of Explosives; Instrumentation; Plastics (with special reference to aircraft materials); Chemical Plant Development; or Library and Information Work.

Grade and starting pay assessed on age, qualifications and experience. Salary ranges:—

Senior Experimental Officer	£705-£895
Experimental Officer	£495-£645
Asst. Experimental Officer	£220 (at age 18)-£460

Rates for women somewhat lower above age 21.

Write, quoting **F.583/49/BZ**, to **Technical and Scientific Register (K)**, York House, Kingsway, London, W.C.2, for application forms, which must be returned by 4th January, 1950.

29.10A20 (71).

MINISTRY OF SUPPLY invites applications for posts in the grades of **PRINCIPAL SCIENTIFIC OFFICER** and **SENIOR SCIENTIFIC OFFICER** at an establishment in Bucks, for research and development work on rocket motors using solid propellants.

Candidates must have an Honours Degree in Chemistry. For the P.S.O. post experience in post-graduate research and in the development of such motors is essential. For the S.S.O. post experience in explosives is desirable, and a knowledge of Combustion, Colloid Chemistry or Chemical Kinetics an advantage.

Normal minimum age for P.S.O. is 31 and for S.S.O. is 26.

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Principal Scientific Officer	£910-£1,177
Senior Scientific Officer	£670-£860.

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Posts are unestablished but carry F.S.S.U. benefits.

Application forms obtainable from **Technical and Scientific Register (K)**, York House, Kingsway, London, W.C.2, quoting **F804/49/BZ**. Closing date, 14th December, 1949.

1.11A62 (31).

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(1) **MECHANICAL OR CHEMICAL ENGINEER**

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(Ref. C208/49/BZ) for work on artillery equipments and associated engineering problems. Experience of high quality engineering design, e.g., power units, servo motors, hydraulic gear, remote power control, automatic food mechanism, etc., is essential.

Candidates, who must be at least 31 years of age, should have an Honours Degree or equivalent qualification in Mechanical, Electrical or Chemical Engineering, as appropriate.

Salary will be assessed within the range of £910-£1,177. Rates for women are somewhat lower. The posts are unestablished but carry F.S.S.C. benefits.

Application forms, obtainable from Technical and Scientific Register (K), York House, Kingsway, London, W.C.2, quoting the appropriate reference number.

Closing date, 19th December, 1949.

2.11A76 (30).

THE CIVIL SERVICE COMMISSIONERS announce Open Competitions, to be held during 1949, for permanent appointments in the basic grades of **INDUSTRIAL CHEMISTS** and **CHEMICAL ENGINEERS** in the **Departmental Class, Admiralty, Ministry of Supply**, and possibly other departments.

Candidates must be at least 23 and under 44 years of age on 1st August, 1949, for the Admiralty, and at least 23 and under 38 years of age on 1st August, 1949, for the Ministry of Supply.

Candidates must have obtained (a) a University Honours Degree in Metallurgy, Engineering, Chemistry, Physics or Chemical Engineering; or (b) have Associate-ship of the Royal Institute of Chemistry, the Institution of Metallurgists or the Institute of Physics; or (c) have Corporate Membership of the Institution of Chemical Engineers. Successful candidates admitted under (a) or (b) must have completed at least three years' approved experience in a factory or industrial laboratory before confirmation of appointment. Exceptionally, candidates able to provide alternative evidence of very high professional attainments may be accepted.

Starting salary fixed according to age, the inclusive salary for men aged 26 in London posts being £500, rising by annual increments of £25 to £750. Salaries for women and for posts outside London are a little lower. Posts in higher grades on scales (for men in London) of £750 to £1,000, £1,050 to £1,270, and higher scales, are normally filled by promotion from the basic grade.

Further particulars and application forms from **The Secretary, Civil Service Commission, Scientific Branch, 27, Grosvenor Square, London, W.1**, quoting No. 2843. Completed application forms must be returned (1) before 1st December, 1949 (for civilian candidates in the Kingdom) or 14th January, 1950 (for members of the M. Forces or candidates from overseas).

4640/100

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THE CIVIL SERVICE COMMISSIONERS invite applications for permanent appointments in the **EXPERIMENTAL** and **SENIOR EXPERIMENTAL OFFICER** grades at the Atomic Energy Research Establishment, Ministry of Supply. Duties will include:

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(2) **Chemical Engineering.**

Candidates must possess at least Higher School Certificate, or equivalent, with chemistry or an engineering subject as a principal subject. They should have considerable experimental or technical experience.

Applicants for the Senior Experimental Officer grade must be 35 or over; for the Experimental Officer grade they should be at least 28 but applications from candidates of outstanding quality, aged 26 or 27, may be considered.

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Further particulars and application forms from: **The Secretary, Civil Service Commission, Scientific Branch, 27, Grosvenor Square, London, W.1**, quoting No. 2856. Completed application forms must be returned by 6th December, 1949.

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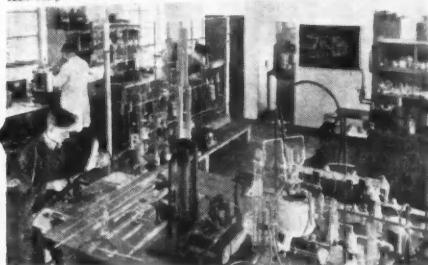
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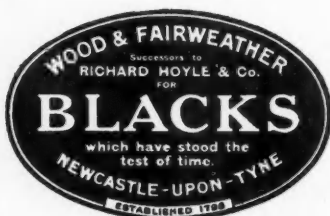
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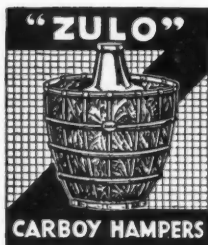
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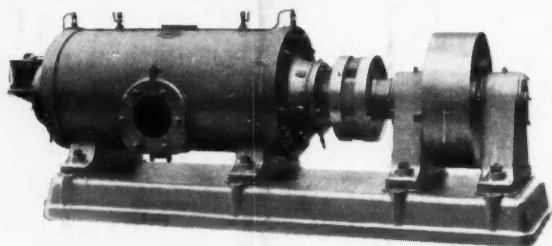
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